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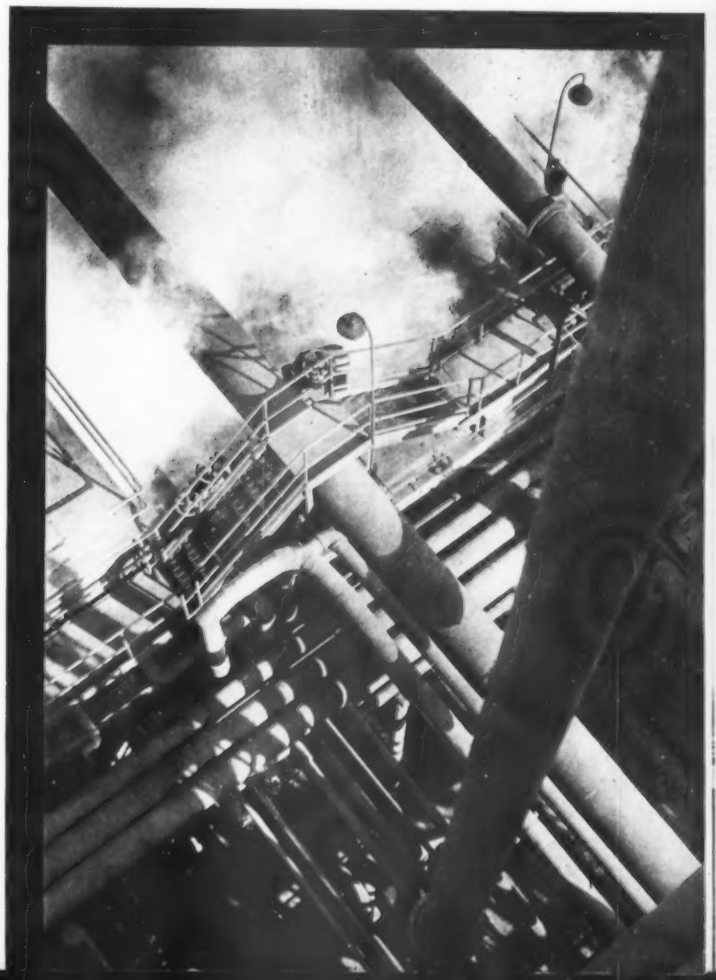

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WORLD PETROLEUM

(Incorporating "Petroleum Equipment Exporter")

VOLUME III — EDITOR, E. W. MAYO — NUMBER 7

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Oil in the Western Hemisphere

Architectural detail from The Rhenania-Ossag Mineralolwerke A. G. building at Hamburg.

NEW YORK • WORLD • LONDON

PETROLEUM

SUFFICIENT time has elapsed to permit an evaluation of the recent World Oil Conference at New York in proper perspective. It was impossible to do this in our June issue which appeared the day after the conference suddenly ended.

World Conference Results

We pointed out in that number that the greatest achievement of the conference was the restoration of the *entente cordiale* among the major international companies. While the meeting provided the opportune occasion for a closer understanding among the leaders of this group agreement was greatly facilitated and perhaps really made possible by the fact that changes in personnel in certain companies have eliminated old enmities which were long a source of friction. This improved relationship is likely to bear fruit in many practical ways hereafter. An immediate concrete example of this will be witnessed in the Indian market.

Having achieved a condition of real harmony it was possible for the conferees to consolidate this definite gain by entering into an undertaking not to negotiate separately with the Russians hereafter. The understanding in relation to further purchases of Russian oil in the immediate future was a practical expression of this solidarity. In relation to this phase of the subject it appears that Russia is at a disadvantage in comparison with the allied interests. The international organizations that in the past have been important purchasers from Russia can reduce their takings with no embarrassment beyond some temporary inconvenience while the Soviets desperately need the money obtainable from such sales.

A constructive step taken toward the close of the conference was the decision of the delegates to ask the Chairman, Charles E. Arnott, to invite the Roumanians to a conference in Paris at the end of June. If the negotiations there undertaken, which are referred to elsewhere in this issue, can be brought to a successful issue, as now seems probable, it will represent a tangible accomplishment of this movement.

Against the very important success represented by the achievement of allied unity and the placing of the leading international interests in a better position to deal with individual questions that need their attention must be set the fact that the problem of Russian oil is still unsolved and may remain to vex the industry for some time. Yet it cannot be said that the Russians gained any lasting advantage from the conference. In fact it has made their position on the whole more difficult than before.

The Russians were able to capitalize on the publicity which they derived from the conference to strengthen their position among present and potential customers in certain parts of the world. They lost the golden prize of the conference however when they failed to snap up quickly the final liberal offer of the allies to pay them the total of their 1931 oil export return for an export quota not to exceed that of 1930, coupled with a very substantial cash advance. This was an even more generous offer than the preliminary one criticized in our last issue.

Dilatoriness at Moscow, by making it possible for the other conferees to escape acceptance of this agreement was, in our opinion, a stroke of good fortune for the latter. While this may be a cause of satisfaction to those who believe that the Russians should share in such sacrifices as have to be made it is hardly a reason for self congratulation on the part of members of the conference. At any rate the Russians missed a rare opportunity which may never return. They have now been placed in a position of unenviable isolation. A vast expenditure to enlarge their retail distributing system will be necessary if they are to find an outlet for their scheduled exports.

The fullest credit should be given to those who promoted and participated in this constructive movement to restore peace and profit to the international oil trade. The petroleum industry can count to its advantage such progress as has been made. Our criticism of certain individual phases of the operations has been inspired by the belief that a somewhat different procedure might have yielded greater gains. It has not proceeded from lack of sympathy with the purpose of the conference or with its personalities. We have urged a cooperative approach to this problem for many months.

WORLD PETROLEUM is in complete sympathy with the aims of Mr. Arnott and his associates. We admire their courage in undertaking the solution of a grave industrial problem. As the head of a company which has more shares outstanding than any other corporation in the world, Mr. Arnott holds a position that justifies an aspiration to leadership. The very nature of the effort to stabilize a trade of world wide extent and its serious importance to a vast number of enterprises, large and small, imposes, however, the responsibility of carrying on the operations involved in such a manner as to avoid compromising the industry and creating fresh and more serious difficulties.

California's Cooperative Effort

DEMONSTRATION that producers are not helpless to improve conditions if only they will cooperate whole-heartedly has been afforded by developments during the past month in California. Writing at some distance from the scene and without attempting to analyze the detailed methods by which the existing degree of curtailment has been brought about it would seem that the plan in its fundamental aspects should appeal strongly enough to the intelligence of the smaller producers to insure its successful maintenance since it demonstrates the direct dependence of market prices upon available supply. When the cessation of overproduction is followed by a prompt advance in the price received by producers the result speaks with more convincing eloquence than any amount of theoretical argument.

Following the defeat of the Sharkey bill which sought to establish reasonable conservation on the basis of State authority, organizations of independent producers took charge of the movement to effect the necessary curtailment. Committees of these organizations worked out a system of allotment calculated to appeal to the smaller producers since the severity of the restriction imposed by it would bear most heavily upon the larger wells. This touched the crux of the situation for the large producing organizations have stood steadily on the side of conservation and the difficulty in devising an effective plan of action has come mostly from the smaller interests.

While it would have been more logical perhaps to defer an increase in the price of crude until there had been a substantial reduction in stocks the need of convincing the rank and file of producers that such reduction in output as they might submit to would not be in vain was a practical consideration in favor of immediate action. To support the efforts of the forces working for readjustment President K. R. Kingsbury of Standard Oil Company of California addressed a letter to the Executive Committee for Equitable Curtailment extending the definite assurance that if production in the State was brought down to 476,000 bbl. daily by June 23 his company would put into effect an increase of 25 cents per bbl. in the price paid for crude oil.

This offer added a vital element of strength to the Committee's appeal and undoubtedly was a powerful factor if not indeed the deciding factor in enabling its goal to be reached within the time specified. By June 23 the requirement had been met and on June 25 the advance in crude was made effective by Standard of California, the other large purchasers, Shell, Union and Associated Oil Companies, promptly joining in the increase. The increased cost of crude, together with the imposition of the new Federal tax of one cent a gallon on gasoline, made it imperative to raise retail gasoline prices by 2½ cents per gallon which was done on June 27. If this increase can be made to hold the improvement in the California oil situation should be maintained at least during the season of heavy consumption of gasoline.

Its successful operation beyond that time probably will entail a further downward revision in the allotment for daily output. Continued cooperation of the oil producers of the State should be assured by the object lesson which they have constantly before them of an increase of $100,000 daily in receipts for their product.

Credit for accomplishment of a substantial improvement in the position of California's oil producers must be assigned to the committees which labored assiduously to bring about the conditions requisite for the change and to the large purchasing organizations led by Standard Oil of California for bringing to the movement the support necessary to make its successful inauguration possible. The course of events in California will be watched with keen interest by thoughtful members of the petroleum industry who feel a strong reluctance toward the extension of official regulation and who still have faith in the ability of the industry to handle its own problems.

Progress in Power Efficiency

IMPRESSIVELY presenting the advance that has taken place in the application of petroleum to motor propulsion Dr. R. T. Haslam, in opening the Symposium on Chemical Engineering Processes in the Oil Industry at the eighty-third meeting of the American Chemical Society, said that the efficiency of production of automotive power had been increased 300 percent within approximately the past decade. He proceeded to show that this improvement had been accomplished by three major means which he defined as follows:

1. Increase in automotive engine efficiency as shown by a 100 percent increase in power for the average vehicle with only a six percent increase in engine displacement and a 25 percent increase in average speed.

2. Production of anti-knock gasolines by cracking processes and by the use of tetraethyl lead as constituents of gasolines. This has permitted the improvement in power by the use of higher compression engines.

3. Increased production of gasoline per barrel of crude oil entering the refinery. This has been realized by (a) larger use of cracking; (b) improved cracking practice to reduce losses in the process and produce more gasoline with less simultaneous waste in the form of gas, coke and tar, and (c) improved fuel economy within the refinery.

During the same period the amount of crude oil refined within the United States per car registered has declined from about 52.5 bbl. to about 35 bbl. per year.

Dr. Haslam points out that this monumental progress has not resulted from the work of one man, or one group of men, or one industry, but represents the combined efforts of all branches of science and engineering.

It is particularly worthy of note that the extension of scientific knowledge concerning petroleum and the application of this knowledge to practical ends has been an international achievement. Because the refining industry has become so highly developed in the United States, Americans sometimes are inclined to assume that the lion's share of the credit for the striking developments that research has made possible belongs on their side of the Atlantic. In reality scientists in other countries have had a tremendous influence in the development of oil refining. It is well to remember that it was a French paper by Ernst Sorel that first propounded the mathematical theory of fractionation. The first patents on hydrogenation were German. England, France, Germany, Japan, Russia and many other countries have rendered great technological service in developing the refining art to its present high degree.

Not only is scientific and technical knowledge of the habits and capabilities of petroleum more widely diffused than ever before but the application of this knowledge is proceeding on a world wide scale. The strong nationalistic sentiment that dominates peoples today is resulting in the construction of new refineries in countries which heretofore have been satisfied to import their requirements while the necessity of being in a position to compete effectively is leading to the reconstruction and reequipment of existing plants. The factors underlying the growth of the refining industry in countries outside of the United States are discussed by M. David Gould in an article contained in other pages of this issue of WORLD PETROLEUM. New refineries in France, Japan and Mexico; new distillation and cracking equipment in Burmah; large outlays for additions to refineries in Argentina—these are illustrations of the extent to which petroleum refining is spreading throughout the world.

Today, more than ever before, the progress of the refining industry is both technological and geographical. The student of the industry who would arrive at the correct understanding of its manifold problems must consider both factors.

International Conference Resumed in Paris

Delegates from Roumanian Industry Meet Representatives of Major Marketing Organizations for Discussion of Stabilization Plans—Russian Problem Unsettled.

PARIS, JULY 2

ALTHOUGH there have been some changes in personnel the international petroleum conference which met here on June 30 closely resembles both in spirit and in the tenor of its discussions the gathering which assembled in New York in May. It might properly be considered a continuation of that meeting.

The chief difference of course is that the representatives of the Soviet Union who participated in the New York conference have been replaced here by the Roumanians.

It will be remembered that the main question put before the conference in New York related to the possibility of preventing Russian petroleum from being a constantly disturbing factor in the world's markets. After some exchange of views it was proposed that for a period of years the Russians should limit their export of petroleum to an agreed quota and that this should be purchased by various international oil organizations. According to reports generally credited in the trade this suggestion crystallized into an offer to buy a quantity approximately equal to 1930 exports and to pay for it an amount about equal to the total of their 1931 export return. To meet the Soviet demand for credit a large cash advance against anticipated receipts of oil was offered.

From newspaper reports published at the time when the New York conference ended the impression was spread that the proposal had been definitely rejected by the Soviet authorities but according to the most reliable information obtainable it appears that the Russian declination was presented in the expectation of continuing negotiations instead of which the conference was terminated, the surmise being that this was due to pressure from certain high executives who felt that the offer was too favorable to the Soviets under existing conditions.

While the New York conference failed to provide an immediate solution for the Russian oil problem it did have the very important effect of developing a united sentiment among the other members of the conference and the Paris meeting assembled with the advantage of this unity of opinion as to conditions in the petroleum export trade and the action needed for their improvement.

Twenty-five men widely known in the international oil trade were present when Chairman Charles E. Arnott called the meeting to order in the same chamber of the Hotel George V where the Young commission met to revise the German debt agreement. Since a particular purpose of the conference was to consider the Roumanian oil situation the delegation from Roumania was the centre of interest.

This group consists of Constantin Oisceanu (Steaua Romana), president of the Association of Petroleum Industrialists, acting as chairman; M. Constantinescu (Creditul Minier); J. Marinescu (Petrofina); Th. Masterson (Unirea); G. Moriati (Prahova); Otto Stern and E. J. Peters (Astra Romana).

Aside from the Roumanians the makeup of this conference is largely the same as that of the meeting held in New York last month. C. E. Arnott, Harold F. Sheets, and Wilson Cross, represent Socony-Vacuum, Richard Rollins represents Atlantic Refining Company, B. P. Newton and F. Good the Gulf Refining Company and L. V. Stanford the Consolidated Oil Company (Sinclair). T. Rieber, vice president of The Texas Corporation, who was a member of the New York conference, was not at the first meeting but is expected to arrive in the course of the coming week. Standard Oil of New Jersey is represented by H. Y. Seidel with H. von Riederman acting in an advisory capacity. The French Standard interests are not officially participating in the meeting.

A distinguished group of British oil men are here in behalf of leading English companies. This group includes J. B. Aug. Kessler and F. A. C. Guepin of the Royal Dutch-Shell group, Robert I. Watson of Burmah, William Fraser, R. P. Jackson, C. H. Coxon and J. E. Taylor of Anglo-Persian.

At the first day's session of the conference the agenda was presented and agreed upon after some preliminary discussion. Apparently the Roumanians had in mind their exchange of messages with the American Petroleum Institute following the publication of the original Kessler plan and were under the impression that they had been called to confer with representatives of the entire group of American oil producers and that the President of the American Petroleum Institute would be represented, but after the situation was explained to them they expressed their appreciation of the importance of arriving at an amicable adjustment of the situation and their desire to continue the discussions. The Roumanians themselves were in the position of having to refer proposals to Bucharest for final approval.

In dealing with the Roumanian situation an important problem is that of safeguarding the interests of the smaller producers. Since these producers are without marketing organizations the only way of protecting them on a limited output apparently would be through the purchase of their product on an agreed price basis. A point that seems to trouble the Roumanians somewhat is the fact that the Russians are their active competitors for Mediterranean markets. Even though assured of an outlet for 70 percent of their oil at a satisfactory price they do not wish to surrender their trade to Soviet exporters.

According to reports in circulation here the Roumanians have accepted in principle an agreement proceeding along this line. All sorts of rumors regarding the Russian situation are in circulation here. Officially, however, the conference has given no indication that it is considering any further negotiations with the Russians and it is known that the sentiment of leading British and American company officials is strongly against the reopening of the Russian question at this time.

Five-Year Record of Major Oil Companies

Statistical Survey of Earnings of Fourteen Major Petroleum Companies Emphasizes Severity of Deflation Apparent in 1931 Annual Reports.

By C. C. Bailey

THE year 1927 was a difficult one for the oil industry due to overproduction, but the record of 1931 reflects a demoralization of its economic structure such as to make the former period appear in the guise of almost unmitigated prosperity. The appended statistical exhibit embraces most of the major world oil companies and also represents the leading integrated units operating in the United States. Its testimony of severe deflation in the industry last year is almost unanimous and without exception as shown in the declines from the 1930 figures, which were themselves substantially below 1929.

As a matter of fact there is only one point of increase over 1930 in the entire tabulation which can not be definitely traced to changes in accounting procedure rather than any real gains in earnings or net value of properties. Sun Oil Company recorded small increases in total assets and common stock equity, presumably because it was able to maintain earnings moderately above its comparatively conservative cash dividend rate of $1 per annum. Standard Oil (New Jersey) and Socony-Vacuum show gains in some of their balance sheet items, but in both cases a more complete consolidation of subsidiaries in the annual report for last year furnishes a complete explanation. The Jersey company explains this

(Continued on page 314)

Five Year Statistical Exhibit—Major International Oil Companies

(000 omitted except in per share figures)
(Dollars)

		ATLANTIC REFINING	GULF OIL	PURE [12] OIL	ROYAL [17] DUTCH	SHELL UNION	SINCLAIR CONSOL.	SOCONY VACUUM	STD. OIL CALIF.	STD. OIL [4] INDIANA	STD. OIL N. J.	SUN OIL	TEXAS CORP.	TIDE WATER ASSOCIATED	UNION OIL CALIF.
Net for stocks	1931	514	[d]23,670	[d] 470	11,250	[d]27,008	[2][d]22,010	[d] 4,169	14,560	17,596	8,705	3,107	[d]9,954	[d]5,819	[16]3,054
	1930	2,743	10,625	2,618	27,607	[d] 5,069	[1]19,634	[15]44,142	37,675	46,371	42,151	7,745	15,073	8,751	9,605
	1929	17,332	44,490	6,540	50,968	17,573	16,599	[15]74,518	46,633	78,500	120,913	8,242	48,318	14,001	15,020
	1928	16,849	36,325	11,224	41,657	20,395	13,447	[15]77,304	46,084	77,337	108,486	5,008	45,074	14,133	11,102
	1927	2,316	13,708	4,711	41,097	11,345	5,391	[15]36,974	40,211	30,132	40,423	2,791	20,029	5,346	10,048
Earnings per share of common	1931	.19	[d] 5.23	[d] .51	5.5%	[d] 2.23	[2][d] 3.80	[d] .13	1.11	1.04	.34	1.63	[d] 1.01	[d] 1.75	[10] .70
	1930	1.02	2.35	.18	17.9%	[d] .56	[1] 3.01	[15] 1.39	2.88	2.73	1.65	4.68	1.50	.76	2.19
	1929	6.20	9.83	1.52	24.9%	1.26	2.82	[15] 2.35	3.63	[3]4.66	4.75	5.60	4.90	1.73	3.56
	1928	7.72	8.06	3.06	24.6%	2.04	2.21	[15] 2.44	3.66	8.33	4.43	3.63	5.34	2.01	2.93
	1927	.46	3.08	.97	24.4%	1.10	.89	[15] 1.16	3.19	3.26	1.52	2.20	2.77	.21	2.65
Total assets (after deducting depreciation and depletion reserves)	1931	160,489	452,737	213,475	[11]285,007	427,004	[6]	1,038,602	590,730	762,730	1,919,010	95,447	543,330	228,770	202,186
	1930	160,197	482,723	216,552	[11]318,719	471,913	404,860	[15]960,851	610,296	801,184	1,770,994	94,141	581,897	248,302	222,731
	1929	167,248	430,845	215,402	[11]289,641	486,484	400,647	[15]914,130	604,724	697,234	1,767,378	88,473	609,853	251,427	211,207
	1928	155,705	381,743	195,512	[11]247,575	356,906	401,957	[15]882,250	589,990	498,372	1,572,268	74,500	461,818	249,380	195,042
	1927	138,886	347,241	188,828	[11]243,670	348,129	367,894	[15]836,887	579,308	462,606	1,426,601	65,748	324,806	248 909	189,994
Net working capital	1931	35,287	98,059	14,465	17,276	70,282	[6]	259,073	80,866	214,898	585,238	15,994	155,487	43,313	47,676
	1930	45,348	120,853	16,261	59,524	73,470	65,259	[15]261,166	93,707	216,495	561,893	15,087	197,694	57,089	61,828
	1929	54,656	117,749	27,396	172,480	105,005	47,569	[15]264,565	102,241	143,385	613,079	19,208	232,134	51,545	58,851
	1928	49,733	114,594	25,555	116,601	49,075	84,824	[15]268,686	105,744	145,914	568,339	14,832	120,328	52,955	45,328
	1927	44,017	92,974	24,013	99,808	72,861	37,259	[15]258,647	101,071	102,581	516,396	14,309	105,198	46,131	48,127
Total Common stock equity	1931	138,860	304,518	135,228	[11]241,561	236,172	[6]	880,306	563,235	670,745	1,327,032	65,577	397,048	107,042	164,680
	1930	140,935	335,571	137,110	[11]200,117	267,494	293,215	[15]796,826	597,954	676,035	1,264,602	61,675	429,503	116,674	177,749
	1929	144,010	331,236	141,880	[11]289,202	283,870	273,253	[15]741,757	591,624	648,590	1,232,472	57,574	445,090	111,739	179,567
	1928	109,899	289,172	141,835	[11]234,236	253,436	274,425	[15]708,551	575,964	461,462	1,099,069	51,019	369,348	91,116	159,585
	1927	94,787	253,712	135,367	[11]230,036	247,041	237,201	[15]669,668	566,644	407,639	1,015,958	44,251	291,540	81,868	156,330
Gross revenue	1931	98,252	196,057	56,312	13,029	177,583	[2]140,649	....	....	301,338	1,084,926	69,175	138,827	96,265	61,625
	1930	126,873	237,200	64,681	37,104	....	183,921	....	....	457,106	1,381,879	98,334	188,812	134,387	88,975
	1929	153,520	272,413	76,889	51,118	....	199,268	....	....	....	1,523,386	86,008	213,262	175,923	88,864
	1928	150,116	260,336	72,573	41,813	179,195	183,565	....	....	....	1,302,779	64,288	196,234	162,235	85,368
	1927	139,291	246,316	[13]104,072	41,303	140,326	168,814	....	....	....	1,256,505	48,717	141,126	153,098	80,273
Dividends per share of common	1931	1.00	1.50	none	6%	none	.50	.65	2.50	1.50	2.00	1.00	2.50	.30	2.00
	1930	2.00	1.50	1.12½	17%	.70	2.00	....	[9]2.50	2.50	2.00	[14]1.00	3.00	.60	[9]2.00
	1929	2.00	1.50	1.37½	24%	1.40	2.75	....	[9]2.50	[9] 3.25	1.87½	[14]1.00	3.00	none	[9]2.00
	1928	1.00	1.50	.62½	24%	1.40	none	....	3.00	3.50	1.50	[14]1.00	3.00	none	2.00
	1927	.75	1.50	1.87½	23½%	1.40	none	....	2.62½	3.50	1.50	[14]1.00	[7] 3.00	.75	2.50
Book value per share of common	1931	51.49	67.29	44.51	[18] 478	18.07	[6]	27.73	44.33	39.33	48.99	40.75	40.30	18.49	37.55
	1930	52.26	74.16	45.12	[18] 528	20.45	47.66	[15] 25.10	45.64	39.77	49.55	40.14	43.60	20.33	40.53
	1929	53.70	73.33	46.70	[18] 567	21.72	50.05	[15] 23.40	46.06	[3]38.49	48.49	39.71	45.19	20.09	42.59
	1928	54.95	63.80	46.68	[18] 564	25.34	49.90	[15] 22.35	45.73	49.70	44.89	39.79	43.74	18.78	42.65
	1927	47.39	56.95	44.55	[18] 557	24.70	52.60	[15] 22.05	44.99	44.16	41.78	36.85	40.38	17.14	41.23

d. Deficit.

[1] Includes non-recurring profit of $28,000,000 or $4.55 per share. [2] Thirteen months ended Jan. 30, 1932. [3] Paid 50 percent stock dividend March 15, 1929. [4] Statements prior to 1930 were on parent company basis. [5] Plus 2 percent in stock. [6] Published balance sheet is for Consolidated Oil, successor company. [7] Paid 10 percent stock dividend in 1927. [9] Paid stock dividends of 4 percent in 1930 and 1 percent in 1929. [10] Before inventory write-down. [11] Excluding authorized but unissued securities. [12] Fiscal years ended March 31, 1932 etc. [13] Includes inter-company items. [14] Paid stock dividends of 9 percent in 1930 and 1929, 6 percent in 1928 and 3 percent in 1927. [15] Pro-forma figures based on combined figures of Standard Oil of New York and Vacuum Oil, predecessor companies. [16] Based on combined outstanding preference and ordinary shares of par value 1,000 florins. [17] Reports of the Royal Dutch on a parent company basis are given in florins converted at the current rat 3 of exchange $0.403.

Factors Underlying Refinery Construction

Examination of the Trends Indicated by Curtailed, and Therefore More Carefully Thought-out Refinery Reconstruction Programs.

By Joel H. Hirsch

REFINERY modernization programs aggregating several millions of dollars have recently been completed, are in progress, or are being contemplated by a number of American oil companies, despite the fact that general business is at a virtual standstill. The only explanation for this seemingly paradoxical action appears to lie in the fact that the managements, of some companies at least, have come to the realization that further price cutting as a stimulus to sales is out of the question, and that the most satisfactory way to increased earnings is by greater operating efficiency and increased sales resulting from enhanced quality of products.

Typical of reconstruction programs recently completed are descriptions of new installations in this and previous issues of WORLD PETROLEUM. A few notable achievements, which may be briefly mentioned here, are Continental Oil Company's complete reconstruction work (February issue), Tide Water Oil Company's 10,000 bbl. cracking unit (May issue), and Consolidated Oil Company's extensive program, which is discussed in this issue. A number of improvements have been or are being made in refineries outside the United States and these too are treated elsewhere in this issue.

Consistent with the demand for improved motor fuel, most of these expenditures have taken the form of improved cracking and gasoline treating equipment. Notwithstanding present low prices, the motorist is demanding elimination of knocking, quicker starting and freedom from vapor lock, which of course means, in terms of gasoline, high octane value, high volatility, and controlled vapor pressure.

In spite of the fact that the octane number method of rating gasoline has been so generally adopted that price quotations are based on three classes according to octane rating: below 57, 57 to 65, and above 65, with a substantial price differential separating each class, it is interesting to note that the latest United States Government gasoline specifications make no stipulation with regard to this requirement.

Action of the Ethyl Gasoline Corporation on March 1 in raising the anti-knock standard of Ethyl gasoline from 74 to 78 octane number, both stimulated and was stimulated by increased competition on the part of refiners. With octane numbers for premium-price motor fuel averaging in the neighborhood of 76, many refiners contend that the octane ratings of gasolines now on the market are sufficiently high for present-day motor cars.

The twenty-fourth Semi-annual Motor Gasoline Survey, recently released by the United States Bureau of Mines containing the results of extensive examination of 221 competitive-price gasolines and 98 premium-price motor fuels collected from 19 different areas covering the entire United States, gives a clear picture of the quality of gasoline being marketed today. In spite of the trend toward higher octane numbers in individual cases, the average value for the two classes were 60.8 and 75.6 respectively which is slightly under values given in the preceding survey. The figure for premium-price motor fuels can hardly be considered startling since the samples were collected before the Ethyl Standard was raised; but the average rating for competitive-price gasoline is somewhat lower than might be expected. This tendency is probably due to the fact that a number of samples of third grade gasoline, which several companies have recently introduced to meet price cutting, were included in this section of the survey. The survey also reports increasing tendency of refiners to color their products artificially. The report states that 26.2 percent of competitive price gasoline samples were artificially colored compared with 23.2 percent for the previous report. All but two samples of the premium price motor fuel were artificially colored.

In a paper by T. A. Boyd which was read before the Mid-Year Meeting of the American Petroleum Institute in June, it was pointed out that the standard Cooperative Fuel Research test procedure for determining octane numbers gives results which are not always in agreement with actual automobile road test data. Ratings of certain fuels in certain cars may differ by as much as 10 octane numbers from ratings made on the C.F.R. engine operating under the standard conditions of 212 deg. Fahr. jacket temperature and 600 r.p.m. This problem is being intensively studied by the Detonation Sub-committee of the Cooperative Fuel Research at the present time. From other data presented at the meeting

FLOW of crude and refined petroleum products is rapidly changing direction and intensity in response to artificial stimulation furnished by economic nationalism, changing character of requirements, and exploitation of new sources of crude oil. These factors, coupled with the discovery and development of new processes for treating crude and extracting larger quantities of the most valuable constituents, have led the refining branch of the petroleum industry into a state of transition that represents a vital aspect of a changing world industrial set-up. In the accompanying article Mr. Hirsch has attempted by careful examination and analysis to determine in a broad general way the direction in which the refining industry is moving. At a time when all but the most necessary additions to plants are being avoided, the work that is being undertaken is an important indication of what is considered best in processes and equipment.

it would appear that ratings made at higher jacket temperatures and speeds would agree better with road tests. Proposals that the test procedure be modified have met with considerable objection on the part of refiners, who feel that some proposed tests are too severe and that better correlation between actual road tests themselves should be attained before making changes in the laboratory test procedure.

The Monthly Petroleum Statement, issued by the United States Bureau of Mines, shows the extent to which demand for anti-knock gasoline has forced increased cracking. Report No. P 91 issued on April 5, 1932 states that due to increased cracking, the percentage gasoline yield for February attained a value of 46 percent of crude oil run to stills, the highest figure on record. A bulletin issued from the same source on June 7, 1932 and giving official figures on the first three months of this year, shows that while total motor fuel production was 3.6 percent lower than for the same period last year, straight-run gasoline production 1.9 percent lower, and natural gasoline production 18.2 percent decreased, the amount of cracked gasoline increased by 0.7 of one percent. The proportion of cracked gasoline to total motor fuel production, which makes possible direct comparison, was actually 4.8 percent higher than for the first three months of 1931, despite decreased production at practically all other points in refinery operation.

Several new cracking installations have gone into operation during the past year not only in the United States but in other countries as well. While the type of cracking designated as vapor phase (the fact that liquid and vapor phase are only relative terms with considerable overlapping has been alluded to so many times already that further mention seems unnecessary) is tending to become more and more a part of the refining picture, particularly in the reforming of straight run gasoline and naphtha to produce high anti-knock motor fuels, the type designated as liquid phase appears to be more than holding its own in new construction. In view of the fact that two new 10,000 bbl. per day Tube and Tank units, the largest yet completed, have gone into operation during the past year, it appears that it will be a good many years before liquid phase cracking is superseded to any considerable extent.

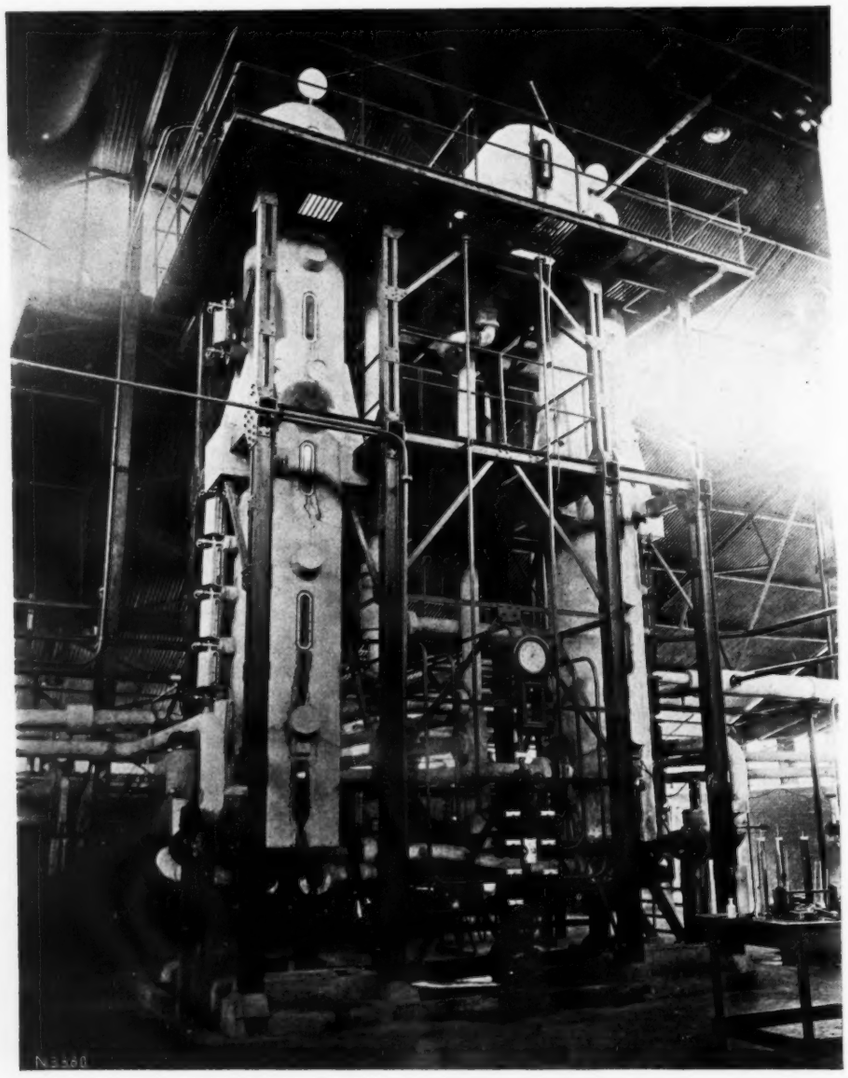
A notable example of construction in progress is the 20,000 bbl. per day combination topping, cracking, and stabilizing unit now being installed for the Standard Oil Company of Indiana at Whiting, Ind. This unit, of modified Cross design and the largest ever built, will go into operation about Oct. 1. It is guaranteed to produce 14,000 bbl. of 375 deg. Fahr. endpoint gasoline having an octane number of 70 or better. Charging Midcontinent crude, the plant is to be operated to produce only two products, stabilized gasoline and marketable fuel oil.

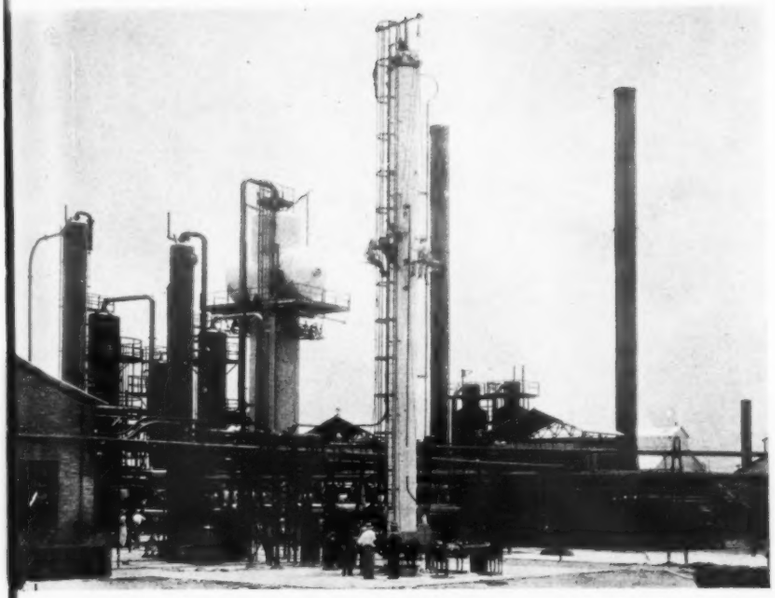
Two tube heaters will be used, one operating as a viscosity breaker and the other as the cracking coil proper. About 30 percent of the crude is flashed off in the fractionating tower in two streams of about 15 percent each. One stream is taken off overhead as a high volatility gasoline and the other which is a naphtha cut is handled in the reforming section of the cracking coil. The remainder of the crude is fed through the viscosity breaker and a selected stock passes through the cracking coil. The viscosity breaker and the cracking section of the cracking coil will operate at about 200 lb. per sq. in. pressure, while the reforming section is capable of operating at a pressure of above 750 lb. per sq. in.

This unit, having a guaranteed fuel consumption of not over six percent, is expected to provide a considerable saving in fuel and handling costs over the type of equipment now in use, which requires several separate units to effect the same result.

Although Soviet Russia has for many years favored vapor phase cracking and has done much to develop vapor phase cracking in the reconstruction of its Kapelushnikoff units, and a good sized Gyro vapor phase unit has recently been completed in Mexico, the great bulk of cracking installations outside the United States have been of the liquid phase type. The U. S. Bureau of Foreign and Domestic Commerce reports 63 Dubbs, 32 Cross, and 12 Jenkins cracking units in operation or under construction in countries other than the United States. In one Canadian refinery a vapor phase unit is being rebuilt into a liquid phase unit. The design trend in liquid phase cracking seems to be definitely in the direction of higher temperatures and pressures, with tempera-

Edeleanu plant in Sumatra.





Gyro Plant in Mexico

tures of 950 to 1,000 deg. Fahr. and pressures of 1,000 lb. per sq. in. occurring in some of the newer installations.

The Standard Oil Company of New Jersey produced between 1,500,000 and 2,000,000 bbl. of petroleum products by the hydrogenation process during the past year. These products included high anti-knock gasoline, kerosene, hydrogenated lubricating oils or hydrolubes, and some specialties.

Some rather extensive developments in gasoline treating have been made or are being made in order to preserve the high octane value of the gasoline, once cracking has made possible its attainment. The trend seems to be quite definitely away from sulphuric acid treating, which in removing the gum forming constituents from the gasoline seriously affects the anti-knock value. It must be said, however, that several improvements have been made in acid treating which makes its use less objectionable. These include lower treating temperatures and mechanical methods for obtaining thorough contact in the shortest possible time.

An increasing number of cracking installations have included the Gray vapor phase treating system, where passing the gasoline vapors through Fuller's earth makes possible polymerization and removal of gum forming constituents without seriously affecting the anti-knock value of the gasoline. A new development in this process is the use of two Gray towers in series instead of one. The Pure Oil Company treats its highly cracked gasoline from the Gyro process by passing crude cracked distillate in liquid form under pressure through a bed of heated Fuller's earth.

The Lachman process, which uses a hot zinc chloride solution of 70 to 85 percent strength in contact with gasoline vapors, has come into considerable use on the Pacific coast.

Much study has been devoted to the action of gum inhibitors and a number of compounds have been found and their action on other properties of the gasoline investigated.

Notwithstanding the many new processes which have come into being for gasoline treating, several others are in the development stage, and it is to be expected that the next year will see considerable new information on this phase of the refining process.

Increased cracking, with its attendant gas production, has been perhaps the chief cause contributing to the widespread installation of stabilizer and vapor recovery equipment. With the necessity for controlled vapor pressure of finished gasoline in order to provide freedom from vapor lock on the one hand, and the necessity for correct volatility to insure easy starting on the other, it has been necessary to install equipment to keep certain fractions, such as propane, out of the gasoline, while a larger proportion of other fractions as butane and pentane, close to it in boiling point, are kept in.

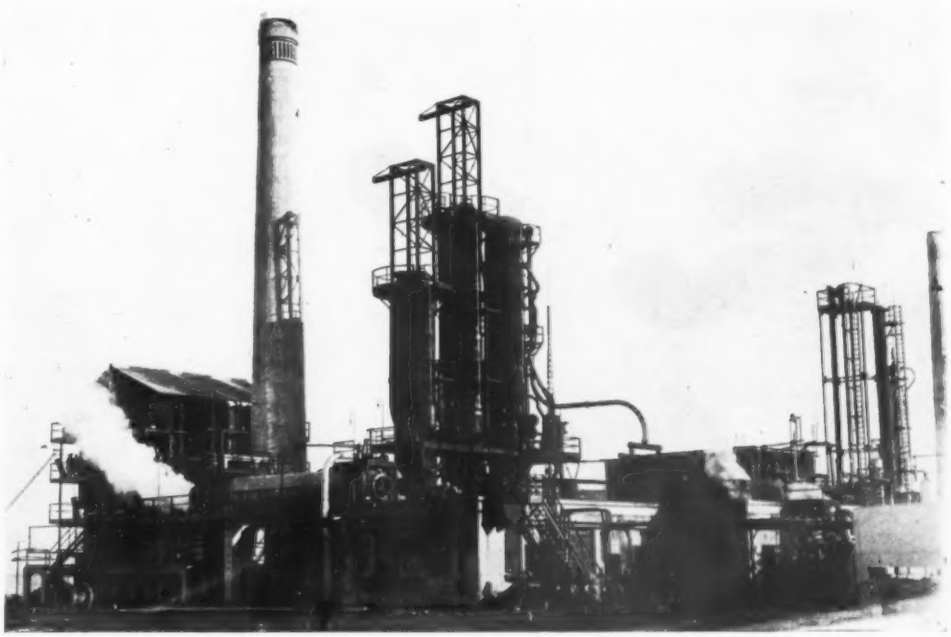
The trend in the design of gasoline recovery plants is quite measurably in favor of the absorption type of equipment, with a number of factors favoring the two still absorption type, an outstanding example of which is described in this issue. Because of the delicate control which must be maintained if this type of equipment is to operate properly, considerable improvement has been made in the automatic control equipment for these installations.

The large amount of vapor recovery gasoline now being made at refineries has caused greatly reduced demand for natural gasoline, and caused the natural gasoline industry to institute a thorough search for new markets.

The gases normally considered as fixed gases, such as propane and lighter are finding increased use. Large quantities are used for fuel about the refinery. Gas engine pumps and compressors have been installed in many cases to utilize part of the large supply available.

The liquefied gas industry which utilized 28,502,819 gal. of butane and propane during 1931 and showed an increase of 58 percent over the preceding year, offers a market which has been given a great deal of serious consideration. On April 1,

Cracking unit of the Mitsubishi Oil Company, Ltd., a step in the program for Japanese economic independence.



the board of directors of the Natural Gasoline Association of America announced the adoption of a set of tentative standards for specifications and testing methods for commercial propane and butane.

Three refineries in the Chicago district recently entered a contract to supply refinery gas to the Northern Indiana Public Service Company.

Many new uses for refinery gases are constantly being developed. Although most of these have not yet attained widespread commercial importance, they offer great promise for the future. Vapors and gases can be cracked with simultaneous production of motor fuel for the gasoline trade and gas for use in the gas industry. Considerable attention is being paid to the use of refinery gas in the chemical industry, among these the production of lamp black and higher alcohols. The Standard Oil Company of New Jersey is making in the neighborhood of 250,000 gal. of higher alcohols per month from olefines in refinery gas at its Bayway, N. J., plant. Isopropyl, secondary butyl, secondary amyl, and hexyl alcohols and the acetates of these alcohols constitute the chief products.

In the straight distillation branch of refining, the pipe still and the fractionating column have become standard equipment. Although this equipment has been used in the United States for some years, it is interesting to note that a large part of the reconstruction work in countries other than the United States has been the replacement of batch and continuous shell stills with pipe stills. In Australia, where tax difficulties have curtailed refinery construction work, the Commonwealth Oil Refineries, Ltd., has installed pipe still equipment during the past year.

In the design of pipe stills the tendency has been to place more and more of the heating surface in the radiant section. Development of greatly improved heat resistant alloy steels has made possible this change in design, with its resultant greater heat efficiency.

The two stage atmospheric and vacuum distillation unit is the type being placed in by far the larger part of new installations. Because of its extreme flexibility, this type of equipment is ideally suited for production of a wide range of products. These usually include overhead gasoline, naphtha, and kerosene, from the atmospheric stage and gas oil, lubricating stocks, and residue from the vacuum stage. The two-stage unit has also found considerable use in re-running gasoline and lubricating oils to produce finished products. A 9,000 bbl. per day two-stage unit which recently went on line in Rangoon, Burmah, is described in this issue. One American company is installing two 10,000 bbl. per day two-stage units and five 6,000 bbl. per day vacuum distillation units at Grozni and Baku in Russia.

In an effort to obtain even more complete recovery of heavy cylinder stocks, a second vacuum stage has been added to some installations. In this type of equipment the bottoms from the vacuum stage pass into another vacuum section, which makes use of a fractionating tower with very few bubble trays. This makes possible a very low back pressure or conversely a very high vacuum on the system and permits extraction of considerable cylinder stock which formerly remained in the residue. The Russian Pengu-Gurvitch unit is of this type. Units similar to the Pengu Gurvitch unit are in operation in the United States.

The demand for lubricating oils having low cold test and a low viscosity-temperature coefficient has been constantly increasing with the result that several new improvements have been introduced both in processing equipment and products. Synthetic lubricants, from polymerization of cracked paraffin wax in the presence of aluminum chloride, have been prepared on commercial scale. The Standard Oil Company of New Jersey is making appreciable headway in the production of hydrolubes by the hydrogenation process. By hydrogenation it is possible materially to improve the quality of inferior lubricating oils.

On Oct. 1, 1931, the Standard Oil Company of New Jersey placed "Paraflow" on the market, a synthetic hydrocarbon, which when added in very small quantities (around one percent) to lubricating oils reduces their pour points by from 25 to 40 deg. Fahr. Enough "Paraflow" to treat in the neighborhood of 20,000,000 gal. of lubricating oil have been sold since this product was placed on the market. "Paraflow" has been found to be very well adapted for reducing the pour point of transmission oils, and its use in this connection is becoming increasingly important.

From the standpoint of processing equipment, it may be said that the filter-aid method of dewaxing to replace the conventional centrifuge and refrigeration systems, bears promise of great possibilities. The solvent method of extraction has been adopted by a number of refineries. The Edeleanu process of extraction with liquid sulphur dioxide is being used extensively on the Pacific Coast and notably by one large East Coast refinery. Using this process, oils of the Midcontinent type may be separated into two oils, one resembling the best paraffinic type of lubricant and the other the extreme naphthenic type of oil.

The advent of free-wheeling has modified lubrication requirements. With bearing pressures in the neighborhood of 20,000 lb. per sq. in. maintaining in this new automotive feature, compared with about 200 lb. per sq. in. in crankshaft bearings, considerable change in lubricant specifications and methods of processing have been necessitated.

Perhaps the most significant development in the refining of kerosene has been the installation of a number of Edeleanu plants. The single plant Edeleanu unit of the Union Oil Company at Los Angeles is said to be the largest in the United States. Several installations have recently been made in other countries, among them Mexico and Burmah. This process is particularly well adapted to kerosene treating, since it removes undesirable aromatic and unsaturated hydrocarbons, and makes possible their subsequent recovery for other useful purposes, whereas acid treating removes these constituents in the form of acid tar which represents a considerable refining loss. Another advantage is that sulphur dioxide may be more easily and completely removed than acid in the finished kerosene. The extracted aromatics and unsaturated hydrocarbons have been found to be exceedingly well adapted for charging material to a cracking coil.

With fuel oil a virtual drug on the market, it is slight wonder that considerable attention has been given to its conversion into other products. The Knowles coking process, which runs fuel oil down to coke, producing high anti-knock gasoline, gas oil, and gas as well, is in use in some refineries. The first installation of this type outside of the United States is described in an article on the new Atzcapotzalco refinery of the Mexican Eagle Oil Company in this issue. Decline in use of fuel oil has resulted from several causes among them, the growing use of natural gas for domestic and industrial heating, use of larger amounts of acid sludge, coke, and refinery gas around the refinery, and more efficient design of tube heaters with larger radiant heating sections requiring less fuel.

While it is obviously impossible to discuss more than a very few of the important refinery developments in a short general review of this nature, reflection on this and other articles in this issue must make two facts apparent:

(1) making allowances for business conditions, considerable technological progress is being made, and

(2) new processes, once their worth is proved, are being incorporated in refineries outside of the United States with rapidity that is both surprising and gratifying.

European Cracking Expansion Necessitated by Demand for More and Better Gasoline

Automobile Registrations Increase Despite Economic Depression; Present Situation Analogous to That Existing in United States About Ten Years Ago.

By Paul Truesdell

EVERY year more of the world's loads are carried by automotive vehicles, and every year the citizens of the world do more of their traveling on rubber tires behind the gasoline driven engine. This is particularly true in countries outside the United States and gives rise to the problem of how to furnish an adequate supply of suitable motor fuel.

Today, the percentage increase in automobile registration in every country of Europe is decidedly greater than in the United States. At the beginning of 1931 there were 35,810,768 automobiles in use in the world, according to the latest figures given in the Overseas Edition of the AMERICAN AUTOMOBILE. Despite the world-wide economic depression, this figure represents an increase of 2.1 percent over the preceding year. Increase for the world outside the United States was 7.2 percent, but the small gain in this country brought the world average down. The increasing importance of motor vehicles outside the United States is shown graphically in an accompanying chart.

Whereas, at the close of 1926 about 80 percent of all automobiles in use in the world were in the United States, with only about 20 percent outside, registrations outside the United States increased to over 25 percent at the beginning of 1931, and has been steadily growing since. All evidence indicates that Europeans, as well as the inhabitants of other continents, are tending more and more to accept the American view and to regard the automobile as a necessary factor in the life of today, rather than a luxury for the rich alone.

With increased international use of the internal combustion engine, not only in the automobile but in aircraft as well, the subject of an adequate world supply of suitable motor fuel becomes of major significance. The problem is one which must be solved cooperatively by the refiner and the engine manufacturer, and one which must be treated in its international aspects. In considering the future of the gasoline engine abroad, the writer believes that many interesting and valuable analogies may be drawn by reflection on the joint development of the American motor and refining industries.

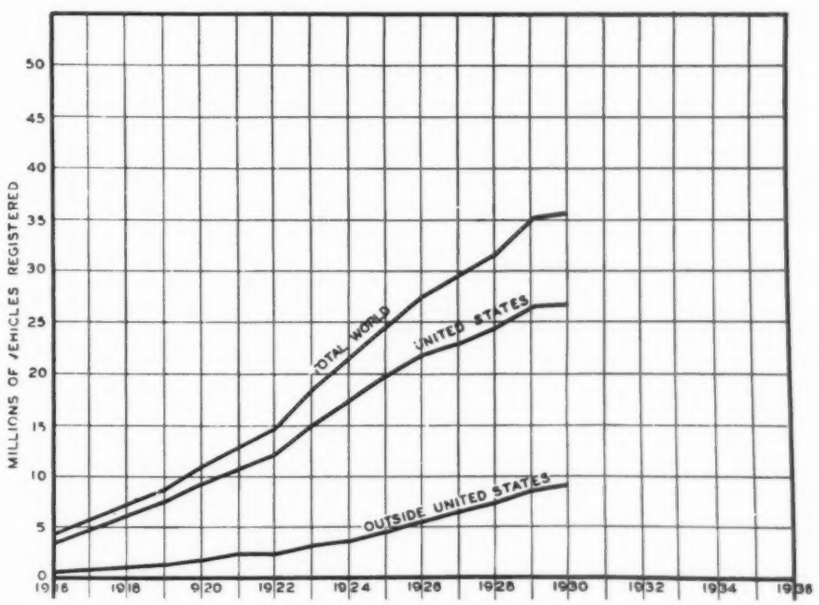
The first "horseless carriage" that snorted its way along an American road under the impulse of the primitive engine, signalized not only the birth of a new industry but the entire revamping of an old one. In fact, so radical was the change destined to be wrought in the oil refining industry by the advent of the motor car that its appearance might almost be said to mark a double birthday—that of the automobile industry and that of the gasoline making industry.

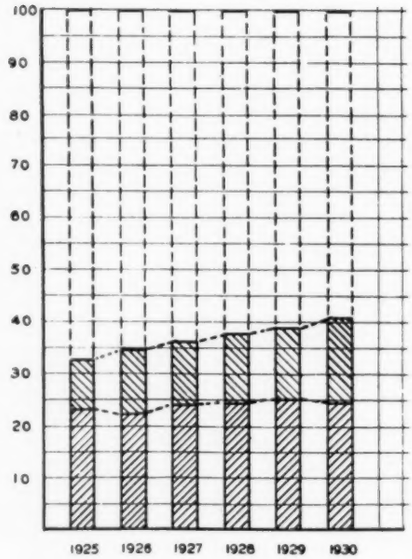
Since the inception of the automobile, the two great allied American industries have passed through three successive stages.

In the first stage, the coming of the automobile gave the oil refiner for the first time a volume market for the gasoline which he had to make as a by-product of his other operations. In the automobile he had an outlet for an almost worthless commodity and a grave source of danger.

The second stage came when automobiles began to appear so rapidly that the oil refiner was compelled to use his utmost diligence and ingenuity to keep up with the demand for gasoline. So insistent became the demand for gasoline, that the refiner was compelled to lower the quality of his product to supply the market at a reasonable price. The gravity of the situation is clearly summed up in an excerpt from Bulletin 191 of the U. S. Bureau of Mines, by H. H. Hill and E. W. Dean, published in 1920, in which the authors remark:

Recent rapid growth in the registration of motor vehicles outside the United States contrasts with the slowing rate of registration increase in the United States.





Straight run gasoline production stabilized while production of cracked gasoline continues to increase.

Several years ago, it was customary to market gasoline having end points of 300 to 350 deg. Fahr. At present the average motor gasoline has an end point of 410 to 430 deg. Fahr.

This change admittedly has not improved the gasoline, particularly as it affects the convenience in operating automobile engines, but has had the decided advantage of insuring to the user an abundant and perfectly distributed supply of motor fuel, whereas, maintenance of the higher standard of quality would have resulted in unavoidable shortages of supply and in sharper increase in cost. The demand for gasoline has increased more rapidly than the supply and it may even be necessary to submit to further decreases of volatility in the future.

The beginning of the third and present stage may really be traced to the development of the cracking process, which began intensively about 1918, and which enabled the refiner to adjust his operations to meet the ever increasing demand. By means of the cracking process the yield of gasoline from crude has risen from 26–30 percent, which was considered good 10 or 12 years ago, to values as high as 75 percent of the crude charged, with yields of better than 50 percent being the rule rather than the exception.

The accompanying table and graphs clearly demonstrate the tremendous conservation of crude oil that has been effected by use of cracking. Inspection of the table shows among other things that cracking has produced a saving of 2,893,-856,875 bbl. of crude during the years of 1925 to 1930 inclusive.

Developed primarily to increase the yield of gasoline, the cracking process was at the start in an uncertain position from the quality standpoint. The following is quoted from Technical Paper 214 U. S. Bureau of Mines, published in 1919, in which the author, E. W. Dean said:

Cracked gasolines are similar to straight refinery products in some physical and chemical properties but different in the matter of containing varying proportions of unsaturated hydrocarbons. The utility of these constituents has not yet been completely determined.

It appears that they have balanced advantages and disadvantages, and it is not yet safe to predict the degree of satisfaction with which cracked products of relatively high "degree of unsaturation" can be used in general service.

Thus far, however, these products have been marketed in the form of blends that are perfectly satisfactory and are generally used without knowledge that they contain cracked gasoline.

Those refiners who mixed cracked gasoline with their straight-run did not boast about it. In fact they did not even mention it. It is recalled with a certain amount of humor that as recently as 1922 or 1923, a large refining and marketing company bought full page advertising space in daily newspapers to proclaim that it was not selling cracked gasoline, and by inference to denounce those refiners who did sell it.

Within the span of about two years, however, general opinion regarding the relative merits of cracked and straight run gasoline was completely reversed. In 1925 the Standard Oil Company of Indiana came out in large newspaper advertisements to recommend to the public a new brand of motor fuel, SOLITE, and asserted with pride that it was a cracked gasoline. Cracked gasoline had arrived.

As the number of automobiles in use in the United States increased from 9,231,-941 in 1920 to 26,690,949 at the beginning of 1931 and the production of cracked gasoline increased from 15,000,000 bbl. to 164,243,000 bbl., it was discovered that the cracking process was destined to fulfill a mission far beyond the most enthusiastic hopes of its early adherents. Whereas the process was introduced to increase the quantity of gasoline produced, changing conditions soon proved that not only was the quality of the product greatly enhanced, but in view of the increasing traffic congestion on American highways, this improved quality was absolutely essential to continued success of the automobile.

Cracked Gasoline Production and Automobile Registrations in U. S.

Year	Production Cracked Gasoline Barrels	Automobile Registrations
1918	8,500,000	6,146,617
1919	10,000,000	7,565,446
1920	15,000,000	9,231,941
1921	20,000,000	10,464,715
1922	30,000,000	12,239,853
1923	35,000,000	15,092,177
1924	40,000,000	17,595,373
1925	68,582,000	19,954,347
1926	93,736,000	22,001,393
1927	101,226,000	23,133,243
1928	122,554,000	24,493,124
1929	143,759,000	26,564,855
1930	164,243,000	26,690,949

Figures from U. S. Bureau of Mines, Petroleum Facts and Figures, and Automobile Facts and Figures.

With nine million cars on the streets and roads in 1920, traffic congestion was already threatening to become a problem. Leaders in the automobile and oil industries realized that people would not continue to buy motor cars in great numbers if the advantages of speedy travel they brought were to be nullified by traffic congestion that held them down to crawling at a turtle's pace through narrow thoroughfares.

Two courses lay open to improve the situation, (1) to widen streets and highways; (2) to increase the power and speed of automobile engines so that cars could start more quickly, accelerate more rapidly and move through traffic in a more lively fashion. The first course was constantly in progress but could only be

uastecu Petroleum Company's refinery.

followed to a limited extent, and its working was slow at best. It was decided that cars must be equipped with speedier and more powerful engines. There were three possible ways to achieve this result, they considered:

1. To make engines of larger displacement.
2. To increase the number of cylinders.
3. To increase the compression pressure of the engines.

Of these three methods, it appeared that an increase in compression pressure was the most practical. It was found, however, that the gasoline then being sold generally to motorists over the country would not operate satisfactorily in engines of higher compression pressures. The engines were found to "knock" and "knocking" resulted in loss of power as well as producing a noise most annoying to the driver.

C. F. Kettering, Thomas Midgley, Jr. and others began a study of the knock and a search for remedies. Knocking was found to be a function of the fuel, which was aggravated in proportion to increase of compression pressure in the engine. Announcement by Midgley in 1922 of the discovery of tetraethyl lead as a knock deterrent and the widespread distribution of Ethyl gasoline which followed was one of two important contributions of the oil industry to the solution of the American traffic problem.

Kettering and Midgley were not the first investigators of knocking. In 1915, William A. Hall, in England, announced that cracked gasoline tended to knock less than straight-run, but it was not until after more or less extensive marketing of Ethyl gasoline that the full significance of Hall's announcement was generally appreciated.

Under the pressure of increased competition, the cracking process was greatly improved and cracked gasoline subjected to critical study. Curiously enough, it was found that the unsaturated compounds, which had been the greatest cause for apprehension in the early days of the cracking process, were actually the constituents which gave cracked gasoline its outstanding anti-knock qualities.

Demand for higher anti-knock motor fuel has increased greatly even during the past few months. So imperative has this demand become that it is now regular practice by at least one large refining company to crack heavy fractions of straight-run gasoline as a separate operation to enhance its anti-knock value.

In view of the increased number of automobiles being used in countries outside of the United States, and increased traffic congestion which will inevitably follow in the near future, it would seem that a close parallel to the American situation exists and that developments which have done much to alleviate traffic difficulties in the United States would bear close study by motorists, automobile manufacturers, and refiners in other countries of the world.

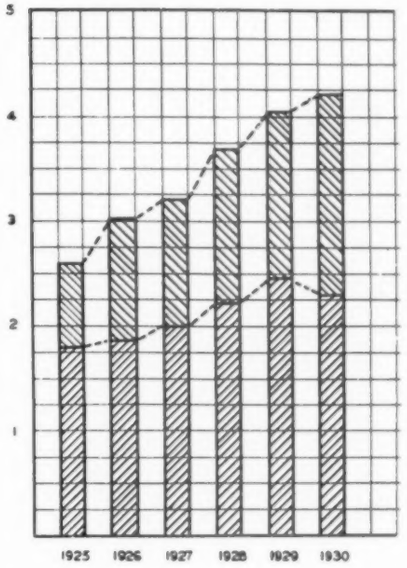
Outside of the United States, it has only been recently that the question of an adequate supply of suitable motor fuel has become a serious problem, although motor fuel has sold at a relatively higher price in other countries than in the United States. Citizens of other countries have not been compelled, as have Americans, to change their ideas concerning motor fuel quality, to fit their notions to their needs.

Gasoline used in Europe and most other countries in the past has been and even today is largely a product of straight distillation. It is usually of relatively low specific gravity and high volatility. This means, of course, that it represents a very narrow cut with correspondingly low yields.

Although European cars have very fine engines, usually of high compression pressure, the knock has not been a very troublesome factor there. This is because even a thoroughly saturated gasoline, such as is usually obtained from crude oil, does not tend to knock easily if it is very high in volatility. In addition to this high grade of straight-run gasoline, benzol has been and still is a very important source of motor fuel in Europe.

It is obvious, however, that the quality of gasoline which has heretofore been regarded as a standard in European and other countries will not be practical when the number of cars in use reaches larger proportions; first because it is needlessly

(Continued on page 298)



Total runs to stills and additional crude that would have been necessary if there had been no cracking.

Conservation of Crude Effected by Cracking Process

Year	Crude oil refined daily	Straight run Gasoline percent of crude	Cracked Gasoline percent of crude	Straight run and cracked gasoline percent of crude	Crude oil Bbl. per day saved by cracking	Crude oil saved by cracking Total barrels per year
1925	2,027,178	23.16	9.27	32.43	811,160	296,973,400
1926	2,134,970	22.88	12.03	34.91	1,122,521	409,720,165
1927	2,270,781	23.77	12.20	35.97	1,166,732	425,857,180
1928	2,495,342	24.00	13.42	37.42	1,395,307	509,287,055
1929	2,705,447	24.78	14.83	39.61	1,589,982	580,343,430
1930	2,584,577	24.53	17.46	41.99	1,842,673	672,575,645
					Total	2,893,856,875*

* Additional crude necessary to meet gasoline requirements had there been no cracking during the years 1925–1930 inclusive.

Mata Redonda terminal, Rio Pánuco, Port of Tampico, Mexico.

Declining Exports of U. S. Refined Products

Economic Nationalism Expressed in Refinery Construction Programs Protected by Tariffs Creates Serious Situation for Exporters of U. S. Refined Oils.

By M. David Gould

THE immediate future of the American export trade in petroleum products will show the effect of two sets of decisions recently taken—in Washington by Congress on a tariff on imported gasoline, in Paris by the international conference of oil producers looking toward an international agreement on production and exports.

The longer-term trend of oil product exports, however, is based in the last analysis on more fundamental factors which act more slowly than an act of Congress or a meeting of oil executives. Since 1924 these factors have been operating adversely to the growth of American exports; since 1930, the adverse factors have been sharply accentuated and have resulted in an actual shrinkage.

The total potential overseas market for American gasoline is measured roughly by the registration of automobiles outside the United States. As the accompanying figures show, the growth in registration of cars outside the United States has been far more rapid than that of American cars, and also has been greater than the increase in export of American gasoline up to 1930.

In 1931, for the first time in American history, total registration of automobiles declined, while indications are that registration of cars outside the United States continued to increase, although at a slower rate, reflecting the world-wide depression.

The second measure of the effectiveness of American export competition is the proportion of American gasoline exports to total gasoline exports of all exporting nations; a cruder measure from a technical point of view because it disregards internal production and consumption of gasoline within the exporting countries; but a most practical index from the standpoint of the American exporter. Here also the latest available figures show a marked loss of ground by American exporters in international competition.

Factors which have caused this are: increased absolute production of crude oil in countries other than the United States, greater refining activity abroad, increased production of benzol and alcohol for motor fuel purposes and increased use of hydrogenation. In the past two years, as the depression has deepened, these factors have been intensified by a great increase in the construction of new refinery capacity abroad, and by the world-wide tendency to raise tariff barriers still higher.

From a broad economic point of view, the last two trends are part of a general tendency to greater national self-sufficiency and economic isolation, a reactionary tendency against the growth of world markets and of specialization of production on an international scale in those countries which were best suited for the manufacture of particular products. The war gave the first setback to this system of national specialization in production and international marketing. The quasi-monopolistic position of Germany in dye-stuff production, for example, was broken down as a war measure. Disruption of export markets during the war, the encouragement given thereby to domestic production and creation of small national vested interests, intensified by the splitting-up of markets and the intimate tying-in of industrial and nationalist politics, has accelerated this trend ever since. In the past year increased difficulties in financing international exchanges of commodities because of inability of all major countries but the United States and France to sustain a gold standard of currency, has further contributed to reduction of export trade to the advantage of national domestic manufacture in countries not having special advantages for production of specific goods.

A marked illustration of this tendency is the situation in France. By the end of last year, actual refining capacity was little over 11,000 bbl. throughput a day; new construction authorized and in part under construction amounted to 44,000 bbl. a day, much of it representing large, modern and efficient plants. The driving force behind the new construction was the direct encouragement of the French government, through new tariff laws and decrees issued in April, 1931, giving substantial benefits to refineries constructed by October 1, 1934.

Second only to Great Britain as a market for motor fuel, France has been shifting its orders in the meantime from the United States to Russia, Roumania and Persia; the proportion imported from the United States has declined in recent years from 65.2 percent in 1927 to approximately 41 percent in 1931.

Should all authorized new capacity be constructed and in full operation, France would import less than 25 percent of her requirements, and that largely from non-American sources, against the situation in recent years in which France has produced 10 percent or less of her motor fuel requirements and imported over 90 percent.

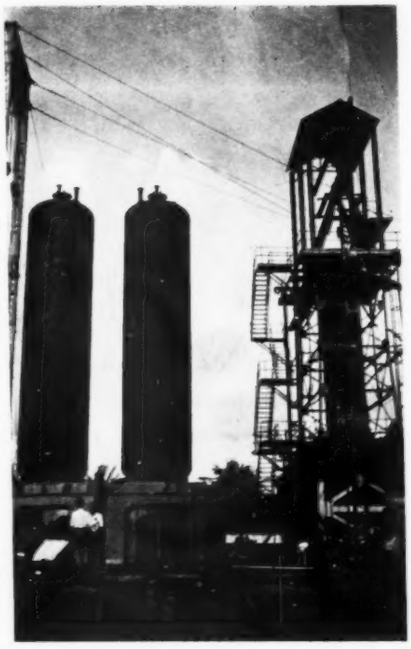
In Germany the situation is complicated by increasing activity in oil production, although it is entirely possible that estimated output of new wells, as is common in oil booms, has been greatly exaggerated. Germany is the third largest gasoline market in the American export trade. Normally its refinery operations account for about a third of its imports of crude, and its domestic production of crude in 1930 was little over five percent of its crude imports. The rate of growth of domestic output is rapid, however, from 100,000 tons in 1929 to 170,000 in 1930 and further development may be expected.

German refinery development in the past three years has been mostly in production of asphalt and heavy oil products. During this period it has added 610,000 tons to annual capacity, or about 6 percent of the total. Large new additions to refinery capacity are in prospect, however, waiting upon developments on the production side.

The percentage participation of American gasoline in total German imports has dropped from 52.9 percent in 1927 to about 43 percent in 1931.

Russia and to a smaller extent Persia were the beneficiaries of the change last year, the Russian share rising from 12 to 20 percent of the total.

England, the largest export market, has been refining about 19 percent of its domestic and reexport requirements, buying some 70 percent of its total imports from the United States. Of its total of 19 refineries with a daily throughput



Reaction chambers in the tropics: the changing flow of oil in world trade.

capacity of 112,000 bbl., six large plants account of 94,000 bbl. of capacity. These figures exclude the Scottish shale retorting plants with a daily capacity of some 40,000 bbl.

The drop in American sales of motor fuel to England in the past year has been sharp. Against some 56 percent of English imports in 1930, latest available figures for 1931 indicate the United States supplied some 44 percent of last year's imports. Substantial increases were reported in imports from Roumania and the Dutch West Indies, while Russia, Dutch East Indies and Trinidad accounted for smaller increases, and purchases from Persia were cut in half.

It is clear from the above that a second determining factor in the loss of export gasoline sales by the United States has been the increasing tendency of other petroleum-producing countries to export their oil in the form of gasoline instead of as crude petroleum. The flow sheet of past years, whereby crude from Latin America came to the United States to be refined and the gasoline resulting therefrom was exported to European and other markets, now shows a substantial amount of by-passing whereby the crude is being refined into gasoline at or near the point of production and thence exported in competition with the product of American refineries. Similar developments are taking place in Roumania, and shipments of Russian gasoline to Baltimore and of Roumanian gasoline to Detroit have strikingly illustrated the reality of this competition, even if they prove nothing as to its profitableness and therefore of its ultimate permanence.

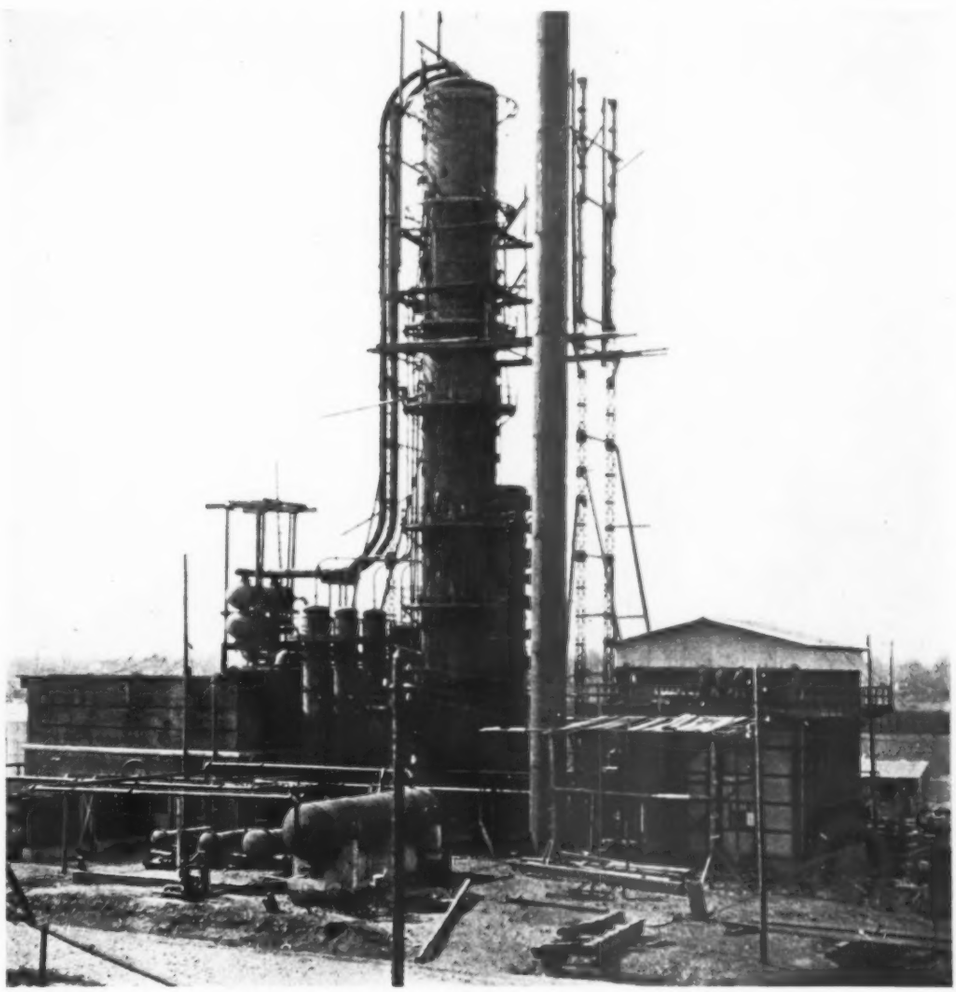
The Dutch West Indies present the classic instance of shifting of competition from the United States to export markets. In the first 11 months of 1931, they produced about as much gasoline as in the corresponding period of the preceding year; sold about 2,660,000 bbl. less to the United States and about the same amount more to Europe and Latin America, with minor shipments elsewhere.

The bearing of these facts on the present tariff situation is clear. Oil once produced will find a market. If it cannot be sold in the United States to consumers as gasoline competitively, or as crude oil to American refiners, it will sell to European consumers as gasoline in competition with the export efforts of American refiners. If a major American export interest can absorb a substantial part of this refining capacity, as in the case of the Jersey-Standard Pan American deal, it simply gives the domestic company the choice of filling foreign orders from a domestic or a foreign refinery. Export competition is in no way reduced, but its ownership and direction may be shifted. The tariff does not effect problems of marketing domestic production at a price which will show a fair return on the investment, since import trade is only a convenience in handling export orders, not a determining factor in the domestic market. Net result is a smaller percentage of operations to capacity for domestic plant.

The increase in production of Russian refineries and the Russian program have been dealt with at some length in the May issue of WORLD PETROLEUM. Russia has sold two-thirds of its total gasoline exports to the three great European markets, England, France and Germany; it has been increasing its relative and absolute sales steadily; and the further development of its export activities will be determined by the decisions reached at the international conferences held in New York and Paris.

At this point it becomes essential to point out the difference between a long and a short term perspective on these problems of international cooperation. The difference between them is the shifting of the status quo which such agreements are intended to preserve. Such shifting is

Economic nationalism in France is finding expression in the construction of modern refineries. Soc. Franco-Roumaine de Petrole's plant shortly after completion.



Motor Vehicle Registration, 1920–1932

(Figures for Jan. 1 of each year)

Year	U. S.	Outside of U. S.	% Gain U. S.	% Gain Outside U. S.
1920	7,565,446	1,286,948	23	
1921	9,231,941	1,710,983	22	33
1922	10,464,715	2,190,609	13	28
1923	12,239,853	2,433,737	17	11
1924	15,092,177	2,931,407	23	21
1925	17,595,373	3,715,735	17	27
1926	19,937,274	4,537,973	13	22
1927	22,001,393	5,512,933	10	22
1928	23,133,243	6,425,117	5	17
1929	24,493,124	7,398,663	6	15
1930	26,501,443	8,473,948	8	15
1931	26,523,779	9,079,397	.08	7
1932	25,814,103	9,244,275		

possible even within a short span of years, is probable over a longer span, and becomes inevitable over a long period. Particularly in the petroleum industry, where sharp unforseen changes can take place in the field of production, it is safe to say that the relation of real productive forces on which the proposed agreements rest will be profoundly modified over a period of years. The intensive exploration campaigns in Soviet Russia either will or will not result in the location of large new potential production; if they do, a more liberal policy toward Russian exports will become necessary; if they do not, Russia will not be able to hold up its end of the agreement and other exporters will rush in to fill the vacuum. The situation within the United States over the next ten years will differ according to whether we do or do not find a new East Texas or Kettleman Hills or West Texas field.

Such international agreements are therefore based on a foundation which is subject to change, and have their best chances of success if limited in term and scope. The immediate problem in hand is to try to stabilize oil export markets and prices; there is a danger that the realization of these aims may be so intimately tied in with the solution of much larger problems as to endanger the probabilities of success of the more limited aims.

Roumania has been increasing its exports of gasoline, latest data indicating an increase of 50 percent for 1931 over 1930, with the bulk of the increase going to the United Kingdom and France. With refinery capacity of 159,000 bbl. daily it leads all Europe outside of Russia in capacity, much of it representing highly efficient plants owned by major world producing interests. As the French refinery construction program progresses, it is probable that Roumania may sell more crude and proportionately less gasoline to France a few years hence. This can only mean in the absence of an effective international agreement a further drive for export sales in foreign markets.

The Dutch East Indies have been losing ground of late as gasoline exporters, although not to the extent that the United States has. Some 55–60 percent of their export sales normally go to the Straits Settlements. The refinery situation there has been stabilized by concentration of ownership and by the readjustment in recent years which has increased crude supply to meet refining capacity.

Classification of Exports of Crude and Refined Oils in 1931 by Percentages of Total of Five Major Groups

	By Value	By Quantity
Crude petroleum	8.3%	22.0%
Gasoline, naphtha, etc.	43.4	37.6
Illuminating oil	13.8	10.7
Gas and fuel oil	9.5	23.8
Lubricating oil	25.0	6.9

In Mexico the declining oil production over a period of years has tended to discourage refinery activity, except for the Aguila plant in Mexico City completed this year, with a capacity of 10,000 bbl. a day. Existing capacity of nine refineries totals 332,000 bbl. daily, but only five of these are in operation, with an average output in 1930 of 71,000 bbl. a day.

Trinidad and Venezuela, which along with Mexico and the Dutch West Indies, ship gasoline to the United States, are of minor consequence, with daily capacities of 35,550, and 25,115 bbl. respectively. In both cases, one large plant and one fairly large one dominate the picture, with a number of 1,000 bbl. plants filling in the scene. In both cases, too, the low gasoline recovery (15 to 20 percent) conditioned by the gravity of the crude and the predominance of skimming and topping plants, with little cracking capacity except at the largest plants, reduces their importance in world motor fuel markets.

Broadly, however, we see the decline in world importance of American export trade in gasoline as the result of the trend toward economic nationalism, expressing itself in the creation of new facilities in importing countries. Effort of certain sections in the American oil industry to counteract the results of this tendency

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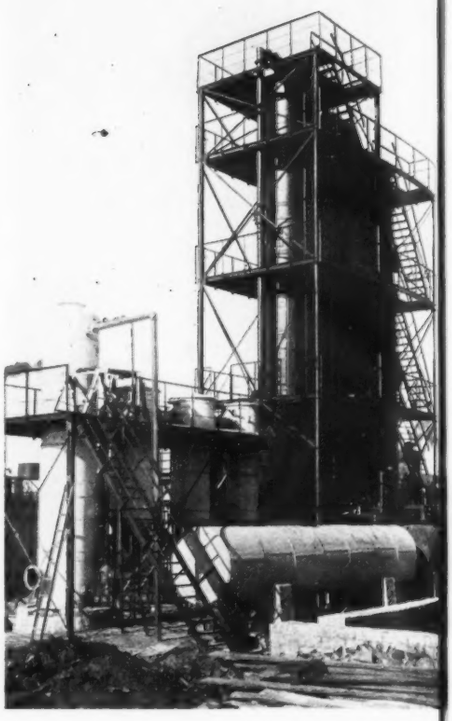
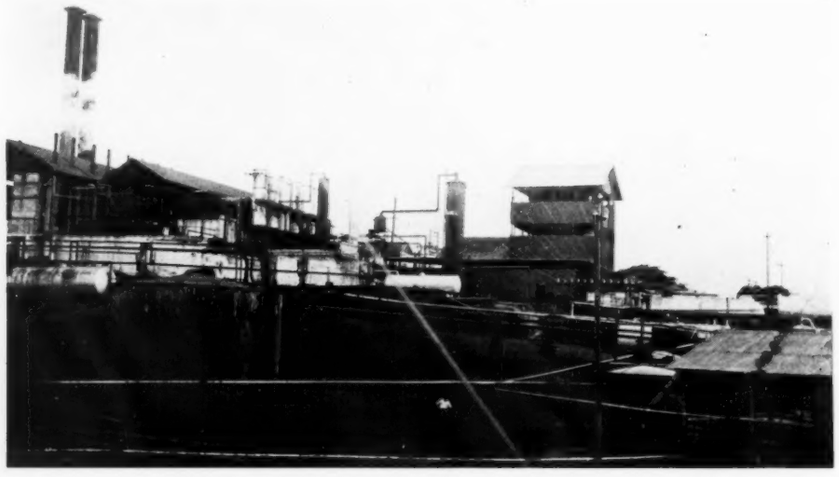


Bubble tower in

Refinery in Trinidad, whose oil export policy may be decided at the Empire conference to be held in Ottawa this summer.



Major Gasoline Markets—Total Imports 1930 and American Share

(in millions of barrels)

	Total	U. S. Share
United Kingdom	27.3	17.5
France	16.3	8.7
Germany	12.2	2.0
Australia	6.9	3.4
Canada	4.4	4.2
British Malaya	4.0	...
Italy	3.3	1.0
Spain	2.9	1.3
Sweden	2.6	1.0
Brazil	2.4	1.1
Netherlands	2.2	1.0
Japan	2.2	under 1.0
Argentina	2.1	2.0

Fighting Economic Conditions with Plant Reconstruction

Sinclair Refinery Construction During the Past Year Improves Company's Ability to Meet Strenuous Competition with Improved Quality Rather Than Cut Price.

THE refinery modernization program carried on during the past year by the Sinclair Refining Company, a subsidiary of the Consolidated Oil Company, is representative of reconstruction plans in progress or contemplated by several American oil companies. The decision of this company to meet trying present-day economic conditions with increased refinery efficiency and to increase sales by enhanced quality of products rather than reduced prices, represents a trend which is becoming more and more apparent throughout the industry.

Chief among the new additions are 15 Sinclair type 600 cracking units, each having a rated charging capacity of 4,000 bbl. per day and a gasoline production in excess of 1,800 bbl. per day. Seven of the new cracking units have been placed in operation at the company's Houston, Tex., refinery, four at Marcus Hook, Pa., three at East Chicago, Ind., and one at Wellsville, N. Y.; while one more unit is under construction at the refinery at Coffeyville, Kans. The Sinclair type 600 installation embodies the de Florez furnace, but in other respects represents a design of the company's engineering department.

Controlled vapor pressure together with maximum volatility of gasoline have been made possible by installation of stabilizer and vapor recovery equipment. New rerun units, debutanizers, stabilizers, and vapor recovery plants are now in operation at Houston, Marcus Hook, East Chicago, and Wellsville. The gasoline recovery units are all of the absorption type, and the two newest plants embody the two-still vapor recovery principle.

A plant for production of overhead bright stock has recently begun operation at Coffeyville, Kans. This plant comprises a contact filtration plant, a centrifuge plant, and refrigeration equipment of sufficient capacity to cool the bright stock mixture to 60 deg. Fahr. below zero.

The expansion program also included the installation of high pressure boilers at Wellsville, East Chicago, and Houston refineries, of which those at Houston may be considered typical. The Houston boiler plant consists of two Babcock and Wilcox boilers with water walls, each capable of generating 120,000 lb. of steam per hour at a pressure of 600 lb. per sq. in. These boilers are arranged so that they may be fired with refinery gas, fuel oil, or pulverized coke, or a combination of these three fuels. When operated at capacity using pulverized coke as fuel, each boiler consumes somewhat over 100 tons daily. The company has adopted a definite policy of installing high pressure boilers, so that steam so produced may be run through back pressure turbines before being delivered to process operations. The generation of electric power at low cost per kilowatt-hour has been made possible in this manner.

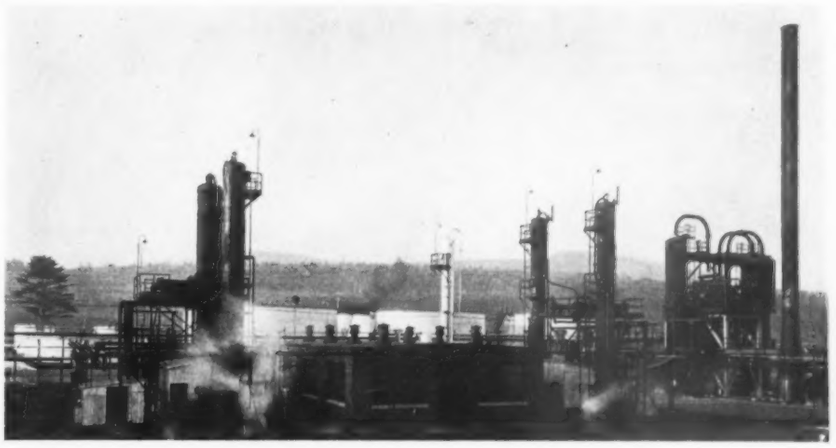
▼

Tanker Explosion

A particularly tragic catastrophe occurred on the morning of June 17, when an explosion on the tanker CYMBELINE caused the ship to take fire, which in its turn resulted in second and third explosions. The explosions and fire took a toll of 27 lives of firemen and workmen, and injured around 40 more. The CYMBELINE was lying at Vickers' dry dock, undergoing repairs to her bottom plates, which were injured when she went aground off Anticosti Island on the inward voyage. Her tanks were naturally empty, and had been flushed out. A rivetting gang was at work and the crew of the tanker were asleep when the first explosion took place just after 3 A.M. on the morning of the seventeenth. A minor explosion closely followed the first. At 4:20 A.M. an explosion occurred which shook the city for miles, and which killed several firemen, including the Chief, and injured a number more. The fire was finally subdued by 5.16 P.M. on the seventeenth.

The drydock was badly damaged by the last explosion, which according to some accounts took place in the dock itself, and until it is repaired the port of Montreal is without dry docking facilities for large ships. No accepted cause for the explosions has yet been advanced. As previously pointed out, the CYMBELINE'S tanks were empty and had been flushed, and all vents were open. The CYMBELINE is owned by C. F. Bowring of Liverpool. She was built on the Clyde in 1927, and has a capacity of 9,500 tons.

Sinclair Refining Company's new casinghead recovery, debutanizer and stabilizer plant at Wellsville, N. Y.



Part of Campsa's distributing organization.

Operation of Spain's Profitable Monopoly

Government Controlled But Privately Managed Campsa Has Succeeded in Supplying Spain with Low Priced Gasoline at a Profit to the Company.

By Dr. Hans Heusser

FIRST attempts made by the Spanish Government to handle the national oil market by the installation of a special monopoly date back to the end of last century. They were not, however, very successful. Later attempts did not give much better results until the year 1927, when the present laws and decrees were enacted. Based on these laws the administration of the monopoly was handed over in 1928 to the C.A.M.P.S.A. (Compania Arrendataria del Monopolio de Petroleos S.A.) The board of directors of this company is composed of private members and official delegates of the Government. The first three-years activity of the company was partly limited because of former contracts which successively had to be dissolved and by inadequate installations. Various experiments with different companies have subsequently been made in such a way, that the original contracts with Mexican and Russian companies, especially with the Sindicato de la Nafta Rusa, were annulled one or two years later and were partly replaced by contracts entered into with two Spanish companies, the Compania Espanola de Petroleos and the Banca Lopez Bru. Other difficulties have gradually been eliminated by the building of tankers and the construction or enlargement of factories, and the organisation of distribution and sales of imported products has also been successfully accomplished.

Campsa in 1931

CAMPSA was fortunate in escaping the depressing effects of the revolution of April 1931 which succeeded in overthrowing the monarchy and establishing the republic with a certain natural adverse reaction on a number of other industries. Shortly after the first exciting weeks of the young republic a new contract was entered into by the Minister of Finance between the Campsa and the Societe des Produits du Naphte Russe which had offered the most favorable terms. As a result of this new arrangement, enforced from July, contracts with the Cities Service Export Oil Company and the Banca Lopez Bru were annulled, the former ending June 30, and the latter at the end of the year. The operations of the Campsa therefore from the second half of the year were based on three contracts; viz., the contract with the Societe des Produits du Naphte Russe, and two contracts concluded previously with the Compania Espanola de Petroleos and the Petroleum Export Association.

General view of the Morrot refinery at Barcelona.

Refineries

THE number of refineries was restricted in 1930 to a relatively large refinery at St. Cruz de Tenerife (Canary Islands) and a small one at Cornella (Barcelona). In view of the unfavorable location of the former and the obsolete equipment with which the latter was working, management of Campsa found it necessary to plan the construction of a new refinery to be properly located within the territory of the free-port of Barcelona. Accordingly plans were formulated and published in 1930. Unfortunately no action was obtained and the plans had to be postponed, due to the fact that a refinery constructed according to the contemplated plan would not be commercially profitable.

Other small plants were active by the end of the year at Alcazar de San Juan, Almeria, Barcelona, Bilbao, Calatayud, Ciudad Real, Coruna, Gijon, Lunares, Palencia, Malaga, Palma de Mallorca,

Recajo, San Sebastian, Santander, Segovia, Sevilla, Tarragona, Valencia and Vigo. In addition to these about 30 other small refineries were in operation. The construction of additional small plants was undertaken during the same period.

Total output of all installations throughout the country increased from 239,000,000 litres in 1929 to 285,000,000 in 1930 and finally to 300,000,000 in 1931.

Campsa's smoking room.

Shipping

IT IS obvious that a concern like Campsa, based on a State monopoly and strictly bound to national industry, could not acquire a sufficient number of tankers in this short time, to eliminate the necessity for cooperation with foreign shipping companies. In spite, however, of all sorts of commercial and political difficulties good progress was made by handing over the construction of several tankers to Spanish shipbuilders.

The concern owned in 1929 four steamships only, namely ELCANO, ZOROZA, REMEDIOS and BADALONA, built during the 1918–1923 period and possessing a capacity of from 6,000 to 7,850 tons each. The first Diesel vessel with a capacity of 10,000 tons was then ordered from the Compania Euskalduna de Construccion y Reparacion de Buques and was launched in 1930 under the name of CAMPOAMOR, having a maximum loaded displacement of 10,000 tons, length overall 138.68 meters, moulded breadth of 17.98 meters and developing 3,600 s. hp. at 135 r.p.m.

The CAMPOAMOR is constructed on the Bracketless System and her propelling machinery consists of twin M.A.N. airless injection Diesel engines, each engine having seven cylinders of 600 mm. diameter, with a piston stroke of 1,100 mm. All auxiliary machinery in the engine room is electric, and the pumping plant with a total capacity of about 650 tons oil per hour consists of two duplex steam pumps. The trial speed of the vessel on normal displacement was 13.8 knots, and she can maintain a service speed of over 12.5 knots.

During the following year a fleet of three 8,000 ton Diesel driven vessels was completed and put into service, each vessel being constructed by a different company; the CAMPOMANES (June 18) by the Sociedad Espanola de Construccion Naval at Puerto Real-Cadiz, the CAMPAS (July 31) by D. Horacio Echevarrieta y Maruri at Cadiz, and the CAMPUZANO (December 12) by the Union Naval de Levante S. A. at Grao-Valencia.

On the suggestion of the Minister of Finance and in order to assist the national shipbuilding industry, which was approaching a severe crisis, it was planned to put another series of tankers in commission before the end of 1931. Accordingly the Compania Euskalduna de Construccion y Reparacion de Buques began building a second Diesel tanker of the same type and capacity as the CAMPOAMOR, and the CAMPOMANES and CAMPAS, two new tankers of 8,000 tons, were laid down. At the same time an order was given to the Union Naval de Levante S.A. for the construction of a shallow draft vessel of about 4,500 tons capacity. This vessel is expected to be very useful in supplying harbors like Palma de Mallorca and Sevilla, where special navigation conditions exist. Finally, an order was placed for two new steamships of 1,000 tons which were to be used in supplying larger vessels within the free-port of Barcelona.

Entire satisfaction with the performance of the CAMPOAMOR, CAMPOMANES, CAMPAS and CAMPUZANO during the period in which they have been in service, decided the owners to install Diesel power also in the two new 8,000 ton tankers as well as in the 4,500 tonner. A first attempt was made to undertake the construction of Diesel engines at the national works and after studying various propositions the Campsa signed contracts with the Sociedad Espanola de Construccion Naval and La Maquinista Terrestre y Maritima under which these companies furnished the electrical equipment to be used by the ships under consideration.

Completion of the program outlined above will give Campsa a fleet of nearly 90,000 tons capacity, which, it is hoped, will enable her to run her entire business without the hitherto necessary assistance of foreign shipping companies.

Gasoline Prices

OWING to the nature of the monopoly, which eliminates numerous expenses incurred by the industry in other countries where unavoidable competition arises between different companies, and which at the same time further allows of the concentration of crude oil and the distribution of refined products in the most simple

Prices of Gasoline in Spain 1928–1931
(pesetas per liter.)

January, 1928	.56
August, 1928	.59
February, 1929	.56
June, 1929	.59
January, 1930	.60
July, 1931	.62
November, 1931	.66

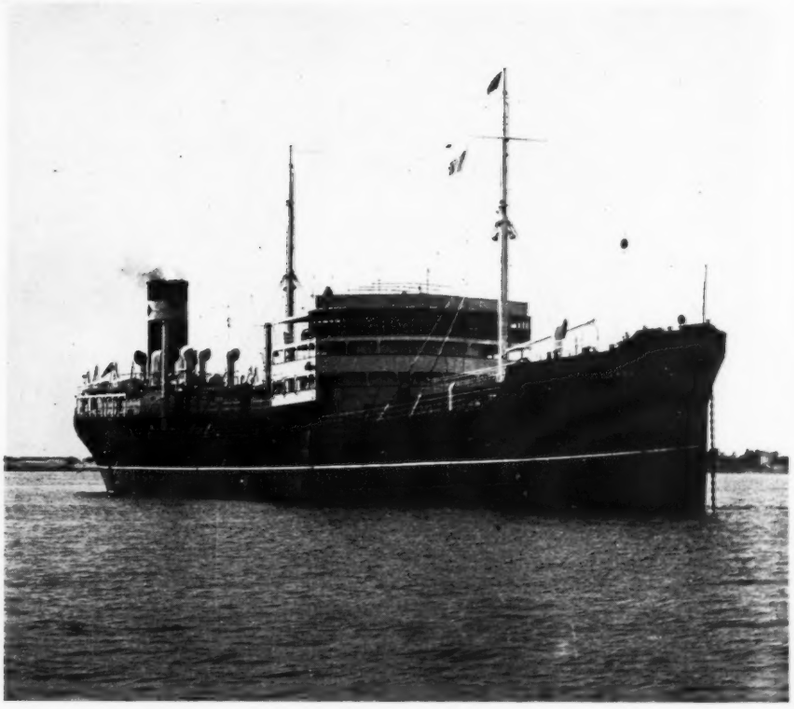
Modern Spanish service station on the outskirts of Madrid.

and direct way, the prices of gasoline within Spanish territory have been extremely low ever since the Campsa concern came into existence.

Compared with the above prices in 1931 the price of gasoline in Rome was 1.22 pesetas per liter; in Berlin .96 pesetas per liter; in Paris .90 pesetas per liter; in Antwerp .65 pesetas per liter; and in London .62 pesetas per liter converted to Spanish equivalent for purposes of comparison.

Financial Position

FOLLOWING suggestions contained in two reports of the Campsa published at the annual meetings held in February 1931 and 1932 remarkable progress is to be observed, favorable both to the private shareholders of the concern and to the Government. The monopoly imported during 1930 a total quantity of crude oil and refined products valued at Ps. 210,-951,168.08 and during 1931 a total quantity of Ps. 176,069,367.73, whereas the total sum realized on products sold amounted to Ps. 427,217,545.98 and Ps. 448,355,888.01 respectively, as shown by the figures in the accompanying table.



Campas, a modern Diesel-driven Spanish tanker.

VALUE OF PETROLEUM PRODUCTS SOLD BY CAMPSA IN SPAIN

(pesetas)

Production	1928	1929	1930	1931
Gasoline	200,222,583	253,846,349	309,617,986	323,561,624
Gas oil	14,264,698	18,017,748	20,849,826	21,731,019
Diesel oil	429,535	1,119,932	946,421	1,187,958
Fuel oil	8,480,811	11,916,954	14,976,749	15,979,633
Lubricants	23,688,476	38,834,618	47,732,350	52,835,313
All other products	23,459,404	29,687,505	33,094,208	33,060,335
Total	270,545,507	353,423,106	427,217,540	448,355,882

One of Campsa's numerous tank cars indicative of the progress made by the monopoly since 1927.

Net profits reached Ps. 170,994,354.53 for 1930 and Ps. 210,377,560.58 for 1931, from which Ps. 164,422,468.34 and Ps. 170,-258,005.65 respectively have been delivered to the State as provided in the original organization.

It is obvious that the favorable position in which the monopoly finds itself at present must be attributed to its connection with the Government and to the contracts entered into by the new Government with the Societe des Produits du Naphte Russe. Taking into consideration the financial progress mentioned, the improving organization throughout the country, and the increasing political stability of the Republic, any new arrangement or dissolution of the Campsa concern may hardly be expected within a measurable time.

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Cracking Unit Under Construction

PENNZOIL Company is installing a Dubbs unit designed to crack 3,000 bbl. of straight-run gasoline per day at Oil City, Pa. This fourth unit of this type installed by Pennzoil is being erected by Arthur G. McKee and Company.

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British Borneo Petroleum Syndicate, through a completely controlled German subsidiary, has obtained a 50 square mile concession overlying what are supposed to be extensive oil deposits in Germany.

Sales division of Mexican Eagle's Atzcapotzalco refinery.

Mexican Refining Near Consumption Center

Mexican Eagle's Recently Completed 10,000 Bbl. per Day Plant, Fed by the World's Highest Pipe Line and Employing Most Modern Equipment, is Logically Located Near Mexico City.

ATZCAPOTZALCO refinery of the Mexican Eagle Oil Company (Royal Dutch Shell Group) is now supplying the largest market in Mexico for gasoline and other petroleum products. Located in the Federal District, which includes Mexico City and several other large municipalities, this new $1,950,000 refinery serves a territory having a population of about 1,500,000, or about one tenth of the total population of the Republic. Construction of this refinery and its crude supply system, a $2,850,000 pipe line from Palma Sola, State of Vera Cruz, has resulted in considerable reduction in freight expenditure. Petroleum products for distribution in the Federal District were formerly shipped by tank car from the coastal refineries, a distance of about 500 km. Although the refinery is not the largest in Mexico—the company's Tampico plant enjoys that distinction—it is completely up to date and all of its equipment is of the latest type.

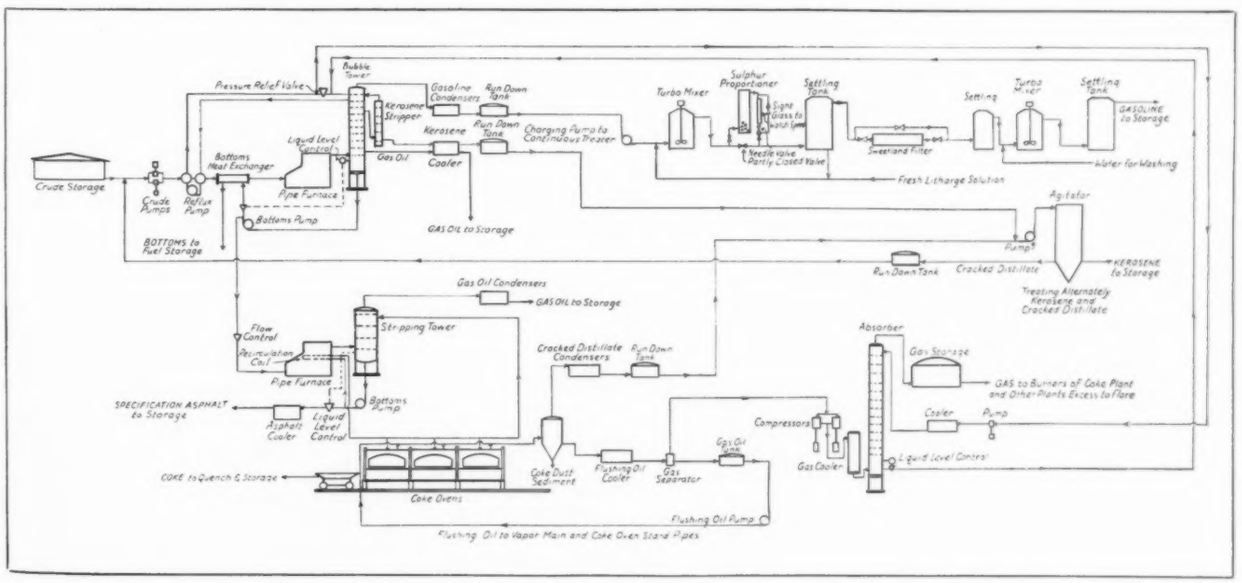
This installation includes a 10,000 bbl. per day topping unit, an asphalt plant, a wax plant, and a battery of Knowles coking ovens. The following products are obtained: gasoline, kerosene, gas oil, Diesel oil, asphalt, coke, and wax.

Of particular interest are the Knowles Coking ovens, which are the first installation of this kind outside of the United States. The coking system reduces a residuum from the asphalt tower to a dense coke of firm cellular structure and high fixed carbon, producing as overhead streams cracked gasoline of high anti-knock value, gas oil and gas.

This plant's essential equipment includes a pipe still for preheating incoming oil, three refractory-lined coke ovens, and coke handling apparatus. The ovens are uniquely constructed each covering a space of about 10 ft. by 30 ft. Floors and sidewalls are lined with tight fitting special alumina clay tile, one foot square. This material makes possible maintenance of temperatures of from 2,350 to 2,400 deg. Fahr. on the hearth.

Accumulation of coke on the oven

(Continued on page 314)



Flow chart of the Atzcapotzalco refinery.

Efficient Refining in a Land of Earthquakes

Associated Oil Company's New Japanese Two-Unit Plant Produces Topped and Cracked Motor Fuel and Lubricating Oil Under Unique Conditions.

By P. H. Woods

THE Mitsubishi Oil Company, Ltd., owned jointly by the Associated Oil Company and the Mitsubishi interests in Japan, has recently completed and put into operation a modern refinery for the manufacture of a complete line of petroleum products. Facilities have been provided for every operation from the receipt of crude oil from ocean-going tankers to the shipping of finished products in bulk or package, even including the manufacture of cans and drums.

The plant is located on Tokyo Bay near Kawasaki, about midway between Tokyo and Yokohama. The site covers about 20 acres of dredger filled ground adjoining the sea-wall of the bay. The fill extends to a depth averaging 60 ft., rests on a bed of alternate layers of sand and clay, and has a surface elevation of only six ft. above high tide. These facts made necessary much study and specialized design for foundations and drainage, as will be explained later.

Operation

THERE are two main refinery units. The first is a combination topping and cracking plant, where light crude is cut into straight run gasoline, pressure distillate, kerosene, gas oil and fuel oil. The second unit serves a double purpose, being able either to cut a heavy crude into the several grades of lubes from transformer oil down to the heavy stocks, or to rerun the pressure distillate.

The topping-cracking unit has a capacity of 3,000 bbl. of 28 deg. crude per stream-day. The charging stock is pumped through an exchanger which is built integrally into the top of the fractionating tower and where a preheat of approximately 350 deg. is attained, then into a vessel which is vented to the flash tower and serves as a suction pot for the warm charge pump. The charge next passes through another exchanger built into the top of the evaporator, attaining here a temperature of about 600 deg. and finally passes into the flash tower. Overhead from this vessel is condensed as straight-run gasoline, and side streams are taken off as kerosene and gas oil.

Bottoms from the flash tower pass to a mixing tank where they mix with recycle stock and are then pumped through the cracking furnace, reaction chamber and to the evaporator. The furnace operates under a discharge pressure of about 750 lbs. and raises the oil to a temperature of 850 deg. Bottoms from the evaporator are drawn off as fuel oil, a portion of the cooled stream being pumped back as reflux to mix with the oil from the reaction chamber just after the pressure reducing valve. The exchanger in the top of the evaporator serves as a partial condenser for the heavy ends of the overhead vapors, and this condensate is returned to the mixing tank mentioned above. The rest of the overhead vapors pass on to the fractionating tower, from which bottoms are returned to the mixing tank and overhead is passed to the final condenser, thence to a separator, where the process gas is taken off, and the pressure distillate is finally ready to be stabilized.

A separate absorber-stabilizer plant operates in conjunction with the cracking unit where the raw pressure distillate is stabilized, then blended as required with the straight-run gasoline after treating. Gasoline recovered from the absorber is added to the stabilized pressure distillate stream as it leaves the plant.

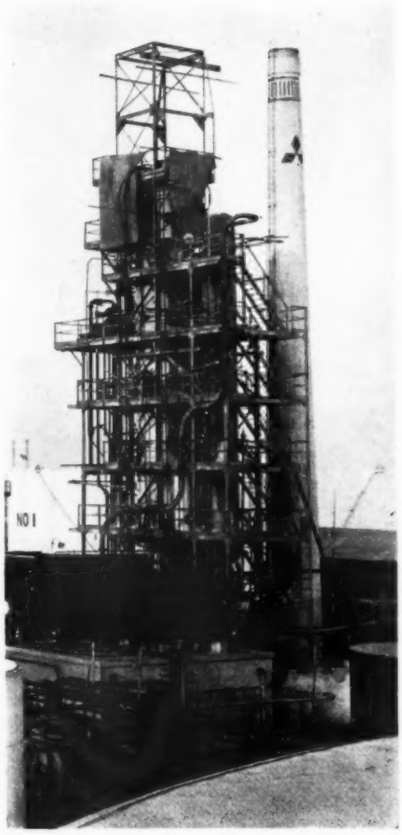
Bearing in mind that at some future time it might be desirable to convert from a direct charge cracking operation to a combination viscosity breaking and cracking scheme, the designers have made provision for the addition of a second heater, which would perform a viscosity reducing operation, partially cracking the reduced crude from the flash tower to a gas oil, the final cracking to pressure distillate occurring in the existing furnace.

Plant

THE still presents no unusual features of design, but incorporates the most modern developments from the experience of the constructors, a well-known American contracting firm.

The atmospheric flash and vacuum distillation lube unit has a capacity of 1,000 bbl. per stream day when refining a 16 deg. crude. Charge passes through a reflux exchanger in the top of the vacuum tower, through the vacuum tower bottoms exchanger, through the furnace, and thence to the atmospheric flash tower. Preheat before the furnace raises the charge to 350 deg., and the outlet temperature from the heater is 650 deg. Overhead from the atmospheric tower is naphtha and a gas oil side stream is taken off. The reduced crude from the bottom of this tower is pumped through a coil in the convection section of the heater and flashed into the bottom of the vacuum tower at a temperature somewhat below 700 deg. Stripping steam is introduced into the base of the tower, and thorough fractionation occurs on the rectifying plates. Overhead vapors pass through the reflux condenser which knocks back sufficient material to serve as reflux, pass thence through a final condenser and are taken off as transformer oil. An ejector, booster, and barometric condenser produce

General view of Kawasaki refinery.



Lubricating Oil Unit.

the required vacuum. Side streams from the vacuum tower condense to light, medium and heavy lube stocks. The bottom stream is blended with fuel oil from the cracking unit and used for refinery fuel.

When the lube unit is used to rerun pressure distillate, the side stream equipment on both towers is cut out of service, and the stream-day capacity is 2,400 bbl. The charge is pumped through the reflux condenser and vacuum tower bottoms cooler to the heater, then flashed in the atmospheric tower. Overhead from this vessel is condensed as light cracked gasoline and run to storage for final treating. Bottoms from the atmospheric tower pass without pumping directly to the vacuum tower where it is again flashed and passed overhead to be condensed as heavy cracked gasoline. A portion of the bottoms stream is reheated in the furnace and cycled back to the tower to provide the necessary heat for vaporizing.

When operating as a lube unit the furnace has a heat input of 5,500,000 B.T.U. per hour, and when operating as a P.D. rerun unit the heat input is 9,000,000 B.T.U. per hour. The cracking and lube —P.D. rerun furnaces are equipped for burning both fuel oil and process gas, use of the latter effecting a considerable saving of liquid fuel. Before being used as fuel the process gas is passed through the absorber mentioned earlier, where a small amount of gasoline is recovered, the dry gas being then ready for use.

Straight-run gasoline, cracked gasoline and kerosene are treated in separate units of a continuous type acid treating plant. For the cracked gasoline this step is intermediate between cracking and rerunning, but for straight-run gasoline and kerosene it is the finishing process before passing to the storage tanks for shipping.

Buildings

BECAUSE of the nature of the soil at the site and the prevalence of severe earthquakes in the archipelago extensive tests were conducted to determine the bearing capacity of the soil and its lateral resistance to shock. It was found that two tons per square foot could be safely used for bearing, but that considerable horizontal tying would be required if adjacent units were connected together with piping. In view of this condition, piling was resorted to under all units. In general, the piles were of wood and about 40 ft. long, the concrete cap mat forming the foundation for the particular structure or group of structures. In the case of the cracking unit an extremely heavy slab very strongly reinforced formed the base for the entire group of structures, tying them together in such a manner that an earthquake would not cause movement of any of the component parts independently of the others. Even firewalls surrounding tanks are set on piles, the base of the retaining type walls forming the cap for the piles.

Buildings are of unusually heavy reinforced concrete and steel truss design. Their strength is such that no damage would occur to them should they be rolled over, aside from crushing the corrugated asbestos roofing.

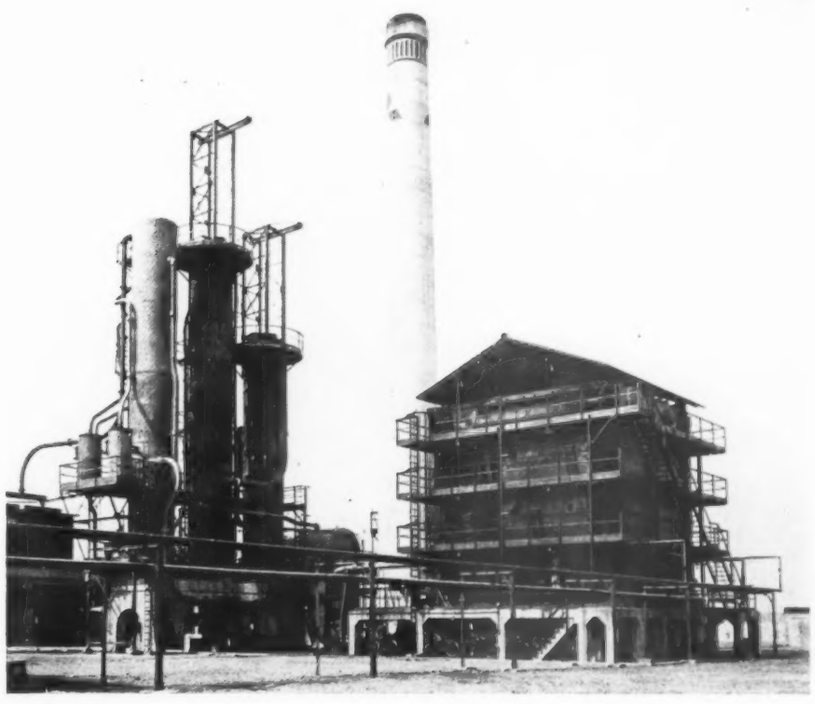
Drainage

WITH rainfall on the order of 70 in. per year, and with the lack of adequate elevation, other means than natural drainage had to be resorted to. Government requirements also are very rigid on contamination of bay waters with oil. With these limiting factors a system of open ditches, closed sewers and a water recovery and pumping plant was designed to care for natural run-off and process waste with a final discharge to the bay containing not more than five parts of oil per million parts of water. Open ditches are used only where there is no danger of burning oil reaching them, while the closed sewer is used in all locations where oil might be handled. Connections between the ditches and sewers are through fire-proof traps to prevent any possibility of flare-backs or explosions.

Auxiliaries

THE general layout of facilities was made in such a manner as to secure a

Cracking units; towers and furnace.



straight-line flow of materials through the plant. Thus, crude is received from ships at the company's own wharf, passed successively to storage tanks, run tanks, refining units and finally to shipping facilities located at the inland end of the site, each unit in the scheme being just inland from the preceding unit.

The wharf was designed by Japanese engineers and is of all-concrete construction. The piles are precast, and are 18 in. square by 60 ft. long. The wharf head is about 37 ft. by 225 ft. and parallels the seawall to which it is connected by a 100-ft. approach constructed in a similar manner. The deck is a 6-in. slab, and the 11-ft. space intervening between the slab and the tops of the piles is filled with columns, beams, struts and bracing forming a rigid superstructure well able to withstand shocks from either vessels or earthquakes. Depth of water varies from 30 to 38 ft. with the tides, so that seagoing vessels may tie up and transfer their cargoes through relatively short lines to the storage tanks.

Tanks are built to A.P.I. specifications, the first of this sort in Japan. They are also the first in Japan to use inside caulking, caulking strips and steeple snap rivets. The largest of the tanks has 80,000 bbl. capacity, other sizes ranging down to the usual small refinery service tank.

Piping throughout the refinery is of welded construction excepting for expansion swings or to break lines into convenient lengths for handling or replacement, in which cases it is screwed and flanged respectively. All valves and fittings are of the flanged type.

Pumps for the refining units are of the steam piston type, transfer of products is effected by centrifugals or rotaries, and the centrifugal is used for miscellaneous applications.

Steam is supplied from a boiler plant having four Stirling type boilers with a total normal rating of 26,000 lbs. of steam per hour. Exhaust steam is used for heating and processing.

A complete package making plant has been built in which cans, drums, and cases are made. This was deemed advisable in order to eliminate the necessity of maintaining a large stock of made-up packages which would otherwise be required because of the distance from the source of supply.

Shops have been provided where operating repairs or minor changes in equipment can be made. The shops, warehouse, and filling and shipping facilities are housed in a group of structures located on a spur track leading into the yard for convenient handling of materials entering and leaving the plant.

An item of interest is that Japanese laborers refuse to work in the rain. With some 150 rainy days a year, construction activities were somewhat hampered, but it is worthy of note that erection of all units was practically complete within 12 months from breaking ground for initial grading operations.

Operations were started in December, the first unit going on-stream on the 14th. Results obtained during the first run, the only one on which data is available, indicate that results are entirely up to expectations and that a crude quite different from that for which the unit was originally designed can be put through with no loss in refining efficiency, and that longer times on-stream will probably be obtained than was at first contemplated.

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Licensing Agreement Concluded

For the purpose of overcoming difficulties which have arisen through diverse ownership of related and complementary patents, The Atlantic Refining Company, Standard Oil Company (Indiana), Standard Oil Company (New Jersey) and Foster Wheeler Corporation have reached an agreement under which each of them will grant licensing rights to a common agent for the use of their fractional distillation patents.

To make this effective they have organized the Petroluem Distillation Corporation, incorporated in Delaware, with an authorized capitalization of 2000 shares of no par value stock. This stock will be purchased by the owners of the patents, that is, Standard Oil Development Company, Standard Oil Company (New Jersey), The Atlantic Refining Company, Standard Oil Company (Indiana), and Foster Wheeler Corporation.

The officers are T. G. Delbridge of The Atlantic Refining Company, President, J. J. Brown of Foster Wheeler Corporation and Robert E. Wilson of Standard Oil Company (Indiana), Vice-Presidents, and these men together with L. B. Nutting of Foster Wheeler Corporation, E. R. Cox of The Atlantic Refining Company, B. K. Brown of Standard Oil Company (Indiana), F. A. Howard and W. R. Carlisle of Standard Oil Development Company, will be Directors.

The new Company has acquired licensing rights under the oil distillation patents of the three refining Companies named and Foster Wheeler Corporation, and has made the last named Corporation its agent for granting licenses under the distillation patents of all the Companies interested.

During the last few years, the older methods of oil distillation have been largely replaced by new and more scientific processes, the most successful use of which involves the application of a large number of new inventions. The Companies interested in the Petroleum Distillation Corporation have been leaders in the development of these new inventions and for some time past have been in negotiation in an effort to find a satisfactory basis under which each could use the complementary inventions of the others. The Atlantic Refining Company and Foster Wheeler Corporation entered into an arrangement of this kind some time ago. To make this agreement completely effective for its intended purpose of permitting the construction of the most efficient modern distillation units, it was found necessary to broaden the arrangement to include the other two Companies. This resulted in the formation of the Petroleum Distillation Corporation, which by acquiring rights under patents of all of the interested Companies, becomes able to grant the necessary licenses not only to them, but also to all other refiners.

Experience of the interested Companies indicates considerably reduced investment costs and appreciable savings in fuel, labor and repair costs by use of pipe stills embodying all of their important inventions. The intention of the Petroleum Distillation Corporation is to make all of their inventions available to all refiners on a uniform basis representing a small proportion of the savings effected.

Foster Wheeler Corporation in its capacity as agent for Petroleum Distillation Corporation will negotiate the necessary licenses and contracts with oil refiners.

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Declining U. S. Exports

(Continued from page 284)

by a tariff, by fighting fire with fire, can be expected only to shift the scene of the conflagration, not to diminish its intensity. Finally, there remains the possibility of an orderly solution of the whole problem by international cooperation.

American Export Trade in Gasoline
(in thousands of barrels)

Year		Year	
1920	15,264	1926	42,480
1921	12,696	1927	43,332
1922	13,788	1928	51,756
1923	20,136	1929	60,007
1924	28,248	1930	63,195
1925	30,636	1931	43,787

Jersey's Model Gasoline Recovery Plant

Extreme Operating Flexibility, Intricate Control System and Unusual Safety Features Distinguish Jersey Standard's Recently Completed Unit at Bayway, New Jersey.

EXTREME flexibility of operation, an intricate system of automatic control devices, and a number of new and important safety features have had the combined effect of making the new gasoline recovery plant at Bayway refinery of the Standard Oil Company of New Jersey an outstanding example of this type of installation. The new plant provides for treatment of about 15,000,000 cu. ft. of refinery gas per day with subsequent recovery of about 1,100 bbl. of gasoline.

Designed by the company's engineers and erected by the refinery construction department, actual fabrication was begun only after construction and careful study of a small scale model had made it apparent that the finished job would conform to the requirements anticipated. Although architects and marine engineers have long realized the value of miniatures in making plans for construction, this is believed to be the first application of this principle to the fabrication of refinery equipment. No effort was made to build a model that would look exactly like the completed plant, but all units and all piping were carefully constructed to scale. The model served its purpose admirably in indicating the accessibility to equipment such as pumps and heat exchangers, and the ease with which control instruments and valves could be operated from the ground and contemplated platforms.

The actual plant consists of a compressor installation, the conventional absorbers, and distillation equipment. The compressors consist of two synchronous motor driven two stage balanced-opposed machines, which collect the gas from the stills in the refinery under vacuum. The compressors have five clearance pocket controls, actuated by a vacuum Stabilog, which automatically maintain a constant vacuum on the suction side.

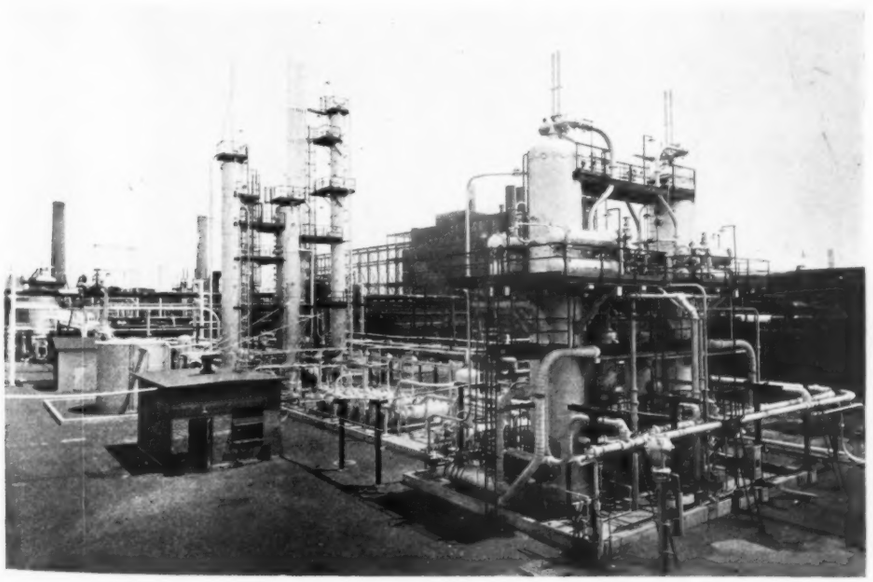
This control instrument, in conjunction with a complete system of automatic temperature, pressure and flow controllers installed throughout the plant, has done much to minimize surging. Elimination of surging is of utmost importance since design factors are based on constant rates of flow of oil, vapor, steam, and gas and a repeated surge or cycling in one section of the plant would reflect throughout the whole system and destroy uniform conditions.

Each of the compressor clearance pockets varies the capacity of the compressor by 14 percent of its total capacity, thereby controlling the operation of the machine from full load down to 30 percent of its rated capacity. In addition to the clearance pockets, the compressors are fitted with inlet valve lifters, which automatically come into operation during starting, when the gas supply falls below 30 percent of the maximum volume and during periods of voltage failure. In the latter case, all of the clearance pockets are opened as well, and the compressors are unloaded in a fraction of a second's time. When the voltage comes on again, the motors pull back into synchronism and the compressors automatically resume operation at the capacity at which they were running previous to voltage failure.

Refinery gas, compressed to about 75 lb. per sq. in. is delivered to the absorber at the left of the group of three shown in the accompanying picture. High pressure gas, released from the cracking coils of the refinery, is delivered to the middle absorber of this group. A smaller portion of this same high pressure gas is delivered to the tallest absorber, shown on the right, in which it is specially prepared for manufacture of hydrogen at the hydrogenation plant located at the same refinery.

Pressure on each absorber is maintained by a duplex recorder controller actuating valves in the release gas line to a 40 lb. per sq. in. high pressure burning line and a 5 lb. per sq. in. low pressure burning line. The control valve in the low pressure burning line is normally floating and the control valve in the high pressure burning line maintains a constant 40 lb. pressure. In the event that the high pressure burning line is unable to absorb all of the gas being released, the control valve in the low pressure burning line opens wider and increases flow to permit the excess to dump into the low pressure line. As the high pressure burning line's requirements increase, the low pressure controller closes sufficiently to maintain a constant pressure on the high pressure burning line. This arrangement is ad-

Jersey Standard's gasoline recovery plant at Bayway, N. J.



vantageous in that it releases the operator from any manual valve adjustments, maintains constant absorber pressure, and furnishes gas to the high pressure burning line as required at constant pressure.

A lean oil of about 39 deg. A.P.I. and molecular weight of about 150 is fed to the top of the three absorbers and is released by a liquid level controller from the bottom into the suction of the fat oil pump. It is then pumped through heat exchangers and delivered to a flash drum at a temperature of about 280 deg. Fahr. Released vapors are delivered to the rectifying section of the high pressure still. The remaining fat oil is passed through a steam preheater in which it is heated to 345 deg. Fahr. and delivered to the feed plate of the high pressure still.

Gasoline is stripped from the oil in a two still battery of the type which has recently become so popular in this branch of the petroleum industry. The first still operates at a pressure of about 80 lb. per sq. in. or slightly higher than the absorbers. A small amount of open steam is used to permit the second still to be operated at about five lb. per sq. in. pressure without the release of any non-condensed vapor. The amount of steam used in the low pressure still is sufficient to strip the oil completely for satisfactory performance when it is returned through heat exchangers and coolers to the absorbers. The vapor portion leaving the top of the high pressure still is condensed in shell and tube condensers and then passes to a gasoline accumulator, from which a part is pumped back for tower reflux and the remaining portion flows to one of the 10 ft. by 30 ft. gasoline receiving tanks from which it is delivered to a stabilizer in another part of the refinery. Temperature Stabilogs installed in the tower vapor lines and operating a valve on the reflux pump discharge maintain the desired reflux rate in each still. Condensate from the low pressure still is pumped back to the vapor line of the high pressure still, thus condensing the light hydrocarbons distilled off in the first still in the presence of the heavier hydrocarbons from the second still. This operation results in less non-condensed vapor and that vapor which is not condensed at a pressure of 80 lb. per sq. in. is delivered directly to one of the absorbers without the necessity of recompression.

An unusual degree of flexibility has been provided in this new plant. A spare pump is provided for each service. The manifolding around the absorbers, heat exchangers and coolers, is so arranged that the individual units may be removed from service for regular inspection or repair work. The piping in and around the stills is also installed so that the fat oil may be completely stripped in one still when it is necessary to remove the other still from service.

No pump house has been included in the plant. The pumps are located immediately adjacent to the piece of equipment from which they take suction. This not only eliminates the cost of a pump house, but materially simplifies and reduces the initial cost of pipe work. From an operating standpoint, it gives more satisfactory performance as all suction lines are short.

A control house is provided which houses a complete set of recording pressure and flow meters, as well as a recording potentiometer which gives a constant record of the important temperatures in the plant. In addition, a push button indicating potentiometer makes it possible for the operators to follow every temperature throughout the plant. Thus, the operator can not only follow all temperatures, rates and pressures in the plant, but may also control those rates which must be changed.

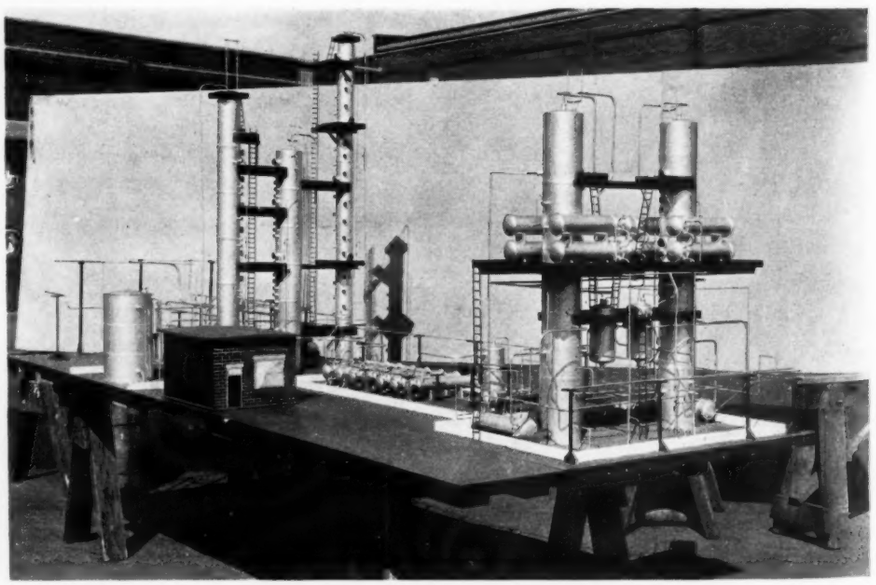
Great care has been given to safety features. A 10 ft. by 30 ft. knock out drum has been provided before the first stage of the compressors. The several vacuum lines in the refinery are connected by a main header to this vertical drum. If a spill should occur anywhere in the refinery and distillate be released with the gas, it would be trapped in this drum before the compressors. A liquid level control near the bottom of this drum controls the steam to a pump, which, in turn, removes liquid from the drum as fast as it accumulates.

The motors which drive the compressors are housed in a separate room with the driving shaft extending through a stuffing box in a fire wall. In addition, to prevent an explosion in case a spark should occur, a positive pressure is maintained in the motor room by blowers which introduce fresh air. All of the pumps in the plant, with the exception of two steam pumps which operate only at short intervals, are driven by explosion proof motors. All vessels are equipped with two safety valves and these valves are so connected that one must be opened when the other is closed. This permits a leaking safety valve to be removed from the system for repair without interrupting the operation of the plant. The release lines from the safety valves are all carried to a height higher than any surrounding equipment as may be seen from the accompanying photographs.

All condenser water in the plant is delivered to a horizontal 10 ft. by 30 ft. drum from which water is released to the sewer system through a water seal. The drum is further provided with a stack which will conduct away any gas, resulting from a split tube in a condenser, to a height where it would readily diffuse with the air. This precaution eliminates the possibility of an explosive mixture building up by gas escaping from manholes of the sewer system.

Operation of the plant was begun about the middle of April and operation thus far has been remarkably smooth.

Model of the Bayway gasoline recovery plant.



Refinery Unit for Heavy Residue

Production of Lubricating Oil from Sludge After 65 Percent Lubes Have Been Removed. Pengu-Gurevitch Type Unit Is Mainly of Russian Design and Construction.

FOLLOWING satisfactory results obtained from three years' operation of an experimental pipe still installation, designed and erected by Pengu and Gurevitch, engineers of Azneft, Russia, in 1926, it was decided to construct a similar plant for commercial production. This commercial plant, with a 450 bbl. daily capacity, is now in successful operation. The following is a description of its operation translated from the Russian of an Azneft engineer named Ter-Gregorian.

The high vacuum plant is operated on goudron, a heavy residue (sludge) after extraction of 65 percent of lubricating oil from residue of a crude with lubricating properties. Goudron has a specific gravity of 0.94 to 0.95; viscosity E_{100} of 11.0 to 12.5; flash Pensky-Martens, 260 to 270 deg.

Goudron at 100 to 110 deg. C. is pumped to asphaltic heat exchangers, where it is preheated to 180-200 deg. C. From there it is pumped to the furnace and heated to 395-400 deg. C., thence passing into a spraying system operated under steam at 400-410 deg. C. This sprays the goudron into an evaporator under vacuum of 600-700 mm. mercury.

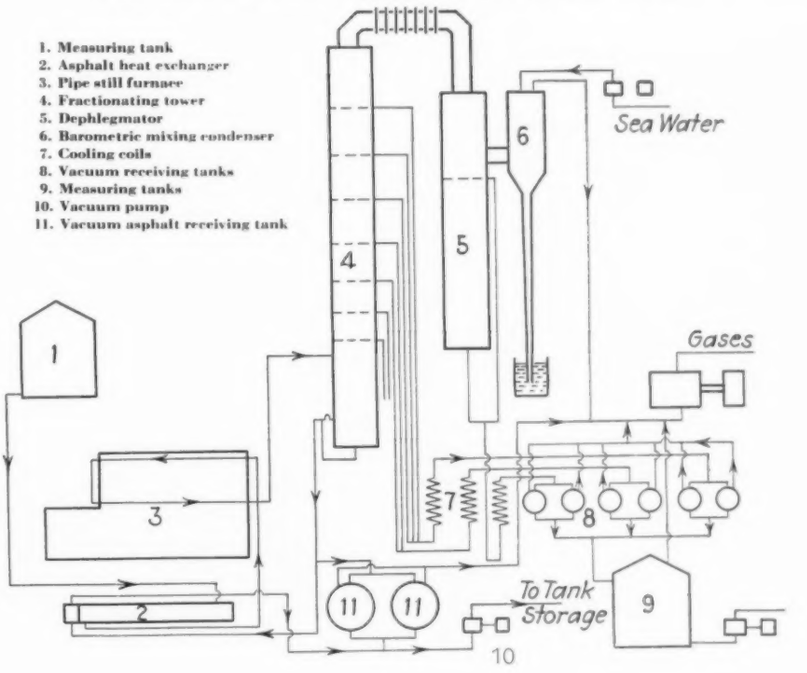
Evaporation takes place at 360-370 deg. C., and the vapors pass on to the first chamber of the fractionating tower; 32-35 percent of the distillate is condensed in the vapor main over the fractionating tower at 225-240 deg. C.; 10-12 percent of the distillate and all water vapors leave the vapor main, and pass into the air dephlegmator where 5-6 percent of the distillate is condensed and all water vapors are cooled; 4-7 percent of lubricating oil vapors and water vapors are condensed in the barometric mixing condenser at 40 deg. C. Permanent gases are drawn off by vacuum pumps that create and maintain a vacuum throughout the installation. Individual cuts are cooled to 60-75 deg. C. and are passed on through vacuum receivers into measuring tanks and through sight glasses to storage. Residue, which is a semi-asphalt, is continuously drawn from the evaporator by a vacuum pump through heat exchangers, and is cooled from 350 deg. C. to 180 deg. C.

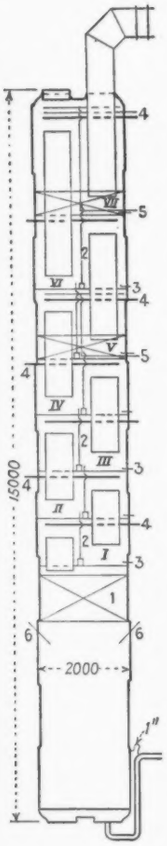
Designed by L. Nersessov, the furnace consists of two combustion chambers, two chambers of pipes for heating liquid, and two chambers for superheating steam, as will be seen from one of the accompanying diagrams. There are two rows of pipes to each chamber. The upper row, situated under the roof of the combustion chamber, two m. high with a protection screen in front of it, is heated by radiation. The lower pipes are built in between the arches and are heated by radiation and convection. Hot gases coming down in the steam superheating chamber pass the lower section of the pipes at approximately 500 deg. C., a temperature which is low enough to prevent their deformation or destruction. Steam superheating chambers have an additional furnace which makes it possible to regulate superheating temperature of the steam.

Tests have been made with the furnace working at capacities of 350 and 500 bbl. per day. These proved of no strain to the furnace, which heated liquid to 400–415 deg. C. without cracking effect. Change of flash point in the liquid before entering the furnace and after leaving it was almost negligible. Each chamber contains 15 steel pipes 6 m. long, 31 mm. inner diameter, and 41 mm. outer diameter. Capacity of the furnace is 2,580 kg. per hour or 0.72 kg. per second, heat transfer being (0.63) (220) (2,580)= 358,000 Calories hour. Heating surface of the furnace is 21.6 sq. m.; total heating surface efficiency is $\frac{358{,}000}{21.6}=16{,}000$ Cal. per hr. per sq. meter. Velocity of liquid in upper chambers is 1.11 m. per sec. and in lower chambers, 1.20 m. per sec. Duration of heating in upper chamber is 75 seconds, in lower, 70 seconds; total, 145 seconds or approximately 2½ minutes. Goudron enters the furnace at a pressure of 1.5 atm. and leaves under a vacuum of 0.6 atm. Total loss of pressure is 2.1 atm.

Fueling the furnace represents 3.7 percent of the input. Stack gases, leaving at a temperature of 400 deg. C. contain 8.5

Flow chart of high vacuum plant operating on goudron (sludge)





Fractionating tower.

percent CO_2. Efficiency of the furnace is 58 percent.

Spraying system is composed of 10 sprayers in the evaporator. They each consist of a barrel welded to the wall at an angle of 45 deg. ending in a flange of 110 mm. diameter, that holds a cock to which the sprayer is attached. Goudron flows through the inner channel and steam comes from the ring at a pressure of 3.0–3.5 atm. The quantity of steam required amounts to 50–55 percent of the goudron.

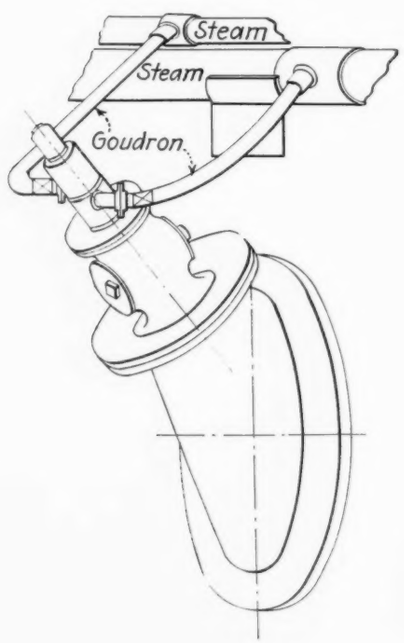
Another important division of the unit is the fractionating tower, the lower part of which acts as an evaporator. At the bottom of the tower the semi-asphalt residue of the process is collected. Residue from the evaporator passes through heat exchangers and is pumped into storage.

The evaporated part of the goudron passes through a splash-preventing make-up, consisting of a layer of 1 m. Rashig-type cups, and enters the fractionating part of the tower. This consists of seven fractionating sections, interconnectable in any desired combination. Each section is provided with a cooling coil.

Water at 40 deg. C. circulates through the coils of sections 4, 5, 6, and 7. Water leaves the coils at a temperature of 55 deg. C., and passes to condensers and heat exchangers to be cooled for recirculation.

The tower is 2 m. in diameter and 15 m. high, of which the evaporator is 4 m.; splash preventor, 1½ m.; and the fractionating section 9½ m. Vapors

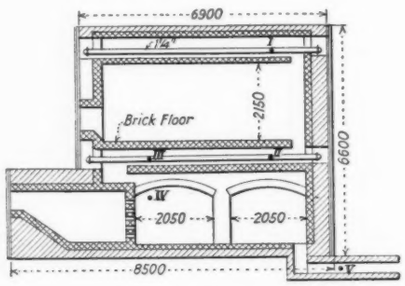
Sprayer for the evaporator.



from the tower pass into the dephlegmator. The latter consists of two sections, both provided with cooling coils. From the upper section of the dephlegmator, vapors pass into the barometric mixing condenser. Here all the uncondensed vapors, as well as some of the oil drops which were carried along, together with permanent gases, are led to a screen of sea water and condensed at 40

Fractionating Tower Process

	Temperature deg. C.	Kg. per hr.
Goudron input	400	2580
Superheated steam	410	1350
Over sprayers	385	....
Semi-asphalt discharge	365	1380
Vapors from evaporator to fractionating section	365	2550



Furnace of goudron plant.

		Kg. per hr.
Cut from section 3 and 4 (heavy oil)	...	75
Cut from section 5 and 6 (middle grade)	...	525
Cut from sec. 7 (light oil)	...	287
Cut from dephlegmator	...	165
Upper part of column (level Temperature)	320°C	....
Vapors leaving column Temperature	235°C	1663
Absolute pressure in evaporator	70 mm. mercury	
Absolute pressure at outlet of column	55 mm. mercury	
Velocity in pipes connecting sections	33 m. per sec.	
Velocity in column	3.3 m. per sec.	

deg. C. Emulsified water runs down into a dike and is trapped. The condenser is connected through an air line to the vacuum pumps, maintaining a vacuum of 720–730 mm. mercury against 680–690 mm. maintained at the evaporator. This loss of 40 mm. of vacuum is sustained as follows; 15 mm. in the column, 5 mm. in the dephlegmator, 18 mm. in the barometric mixing condenser, and 2 mm. in the air line. Under normal steam operation the condenser maintains a vacuum of 400–450 mm. without vacuum pumps.

Vacuum in evaporator	685–695 mm. mercury	
Temperature of goudron from furnace	395–405	deg. C.
Temperature of steam in spraying system	400–420	deg. C.
Temperature of steam in dome column	230–240	deg. C.
Quantity of goudron input	420–450 bbl.	
Quantity of steam for spraying system	50–55 percent of goudron input.	

Tests made with acid treating and contact filteration of distillates yielded the following results:

	Distillate	Treated Oil
Acid treated	2% at 35 deg. C.	.....
Losses	6%	.....
Contact filteration	.....	5% Fuller's earth at 25 deg. C. with steam.
Losses	.....	5 percent
Yield of oil	.....	89 percent
Specific gravity	.....	0.923
Viscosity-Engler 100	2.83	2.62
Flash Pensky-Marten	245	245
Tar percent	12.5	7.5
Pour test	12	15—18
Coke percent	0.5	0.3
Percent of O_2	0.03	0.03

The product obtained is compounded with machine oil in the proportion of 60 percent refinery product to 40 percent machine oil, yielding a motor lubricating oil.

Heat exchangers are of Foster-Wheeler type. Goudron at 100–110 deg. C. enters the heat exchanger and leaves it heated to 180–200 deg. C. Semi-asphalt enters the heat exchanger with a temperature of 330–350 deg. C. and passing the pipes leaves at 180–190 deg. C.

Quality of refined products obtained by this high vacuum process depends entirely on the vacuum maintained, steam supply, and regulation of spraying system.

Most of the equipment for the plant consisted of second-hand machinery or spares which were supplied by other refineries of the Azneft. This irregular supply of equipment caused long delays and losses. The plant was finally put under steam at a cost of 381,677 rbls. (about $190,000).

Specification of Products Obtained from Refining Goudron

Product	Quantity 1000 Kg.	Percent of Yield	Specific Gravity	Viscosity, Engler 100	Pensky-Marten Flash deg. C.	Percent Tar	Percent Coke	Flash Point deg. C.
Goudron	63.0	.....	0.941-0.945	11 -12.5	260–270	.....	5.5- 6.0	.....
Dephlegm cut	3.2- 4.5	5.0- 7.0	0.924-0.926	2.9- 3.1	225–240	12.0-15.0	6.0- 8.0	+ 5-+10
Light distillate	11 -12	19 -19.5	0.923-0.925	3.6- 3.9	255–270	14.0-19.0	1.0- 1.5	+ 4-+ 9
Heavy distillate	8.5- 9.5	14.5-15.5	0.930-0.935	5.5- 6.2	275–315	25.0-32.0	2.0- 3.2	+10-+14
Total cut	23 -26	39.0-42.0	0.923-0.929	4.2- 4.6	.....	20.0-25.0	1.5- 1.8	+ 8-+11
Semi-asphalt	30 -33	51 -55	0.953-0.956	29-34.0	.....	.....	10.0-11.0	.....
Losses	2.5- 4.3	4 - 7	.....	.....	.....	12.0-15.0	.2- .4	.....

Burmah's Refining Increased 38 Percent

Burmah Oil Company's New Two Stage Distillation Unit at Syriam Refinery Adds 9,000 Bbl. to British India's Daily Refining Capacity of 24,000 Bbl.

BRITISH India's refining capacity of 24,000 bbl. per day has been increased by about 38 percent by the addition of a new 9,000 bbl. Foster Wheeler two stage distillation unit, which recently went on line at the Syriam refinery of the Burmah Oil Company. The new installation effects a 65 percent increase in the 16,500 bbl. per day charging capacity of the plant which is situated about four miles south of Rangoon on the Rangoon river. Charging Burmah crude, the new unit recovers eight fractions including overhead lubricating stocks. Relatively higher demand for kerosene than gasoline in Burmah and surrounding Asiatic countries accounts for the higher yield of various grades of kerosene obtained from the unit, as illustrated in the accompanying flow diagram.

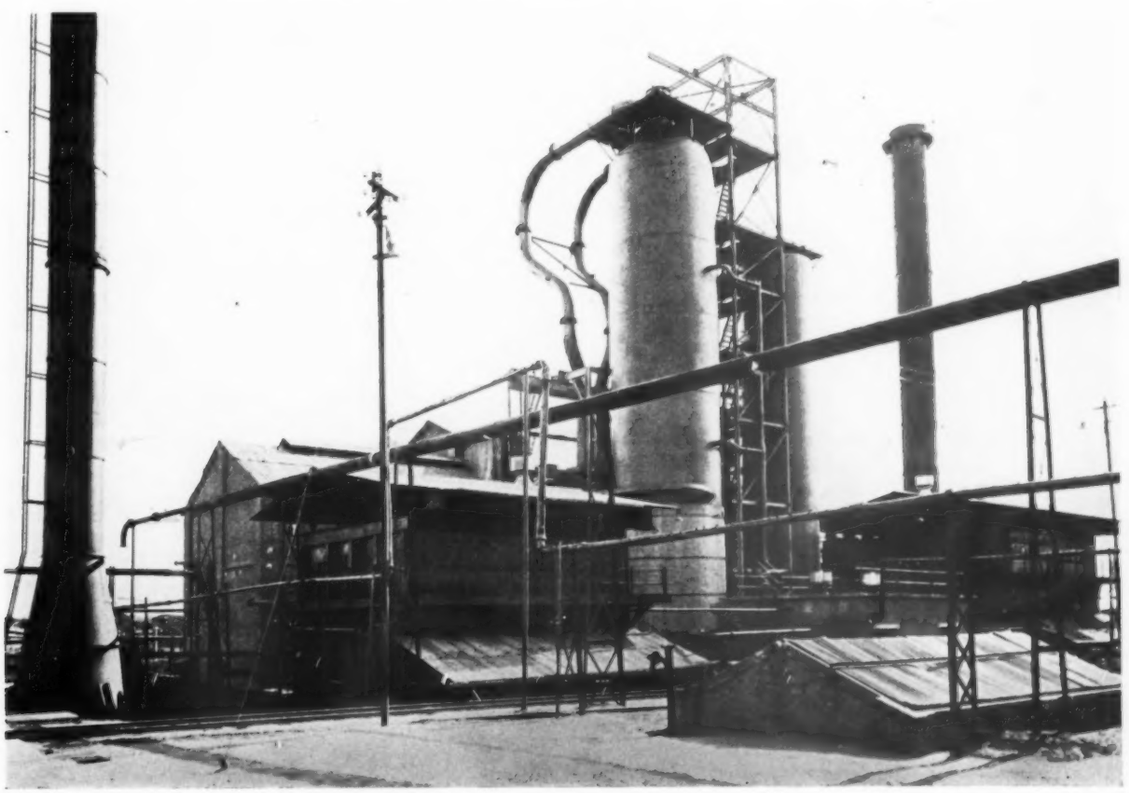
The equipment is of the typical two stage design with added controls and piping, which will permit an unusually high measure of flexibility in operation.

Crude is picked up from storage and heated in heat exchangers to 325 deg. Fahr. before being delivered to the atmospheric tube still or heater. The atmospheric still increases temperature of the crude charge to 535 deg. Fahr. at which temperature it is delivered to the vaporizing chamber of the atmospheric fractionating tower. Gasoline is removed overhead as vapors, and three liquid streams are removed from the side of the tower.

Unvaporized residuum is removed from the bottom of the tower and delivered to the vacuum tube still or heater, where temperature is raised to 705 deg. Fahr. Reduced crude at this temperature is delivered to the vaporizing section of the vacuum bubble tower where it is fractionated into an overhead vapor stream of gas oil, two liquid side streams and a flux residuum. Gas oil vapors are condensed in a heat exchanger and final condenser. Gas oil condensate and two liquid side streams flow by gravity to vacuum rundown tanks connected by balance lines to the steam jet air pump. Fractions are removed from the rundown tanks by reciprocating pumps and are delivered to storage.

Vacuum is maintained on the vacuum tower by a complete vacuum actuating apparatus connected to the hotwell of the final gas oil condenser. Vacuum balance lines also are connected to the three rundown tanks so that the side streams will flow into them by gravity. The actuating equipment includes a thermo compressor, a barometric condenser and a steam jet air pump. The thermo compressor removes uncondensed vapors from the gas oil condenser. These vapors are compressed to a pressure at which they can be condensed with the relatively warm circulating water available in this refinery. These compressed vapors are then condensed in the barometric condenser and the air and permanent gases are removed by the steam jet air pump.

Each of the tubular oil heaters is equipped with an integral superheater which receives exhaust steam from the pumps. This steam is superheated for process work within the tower. Use of highly superheated steam for process



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Burmah's two stage distillation unit.

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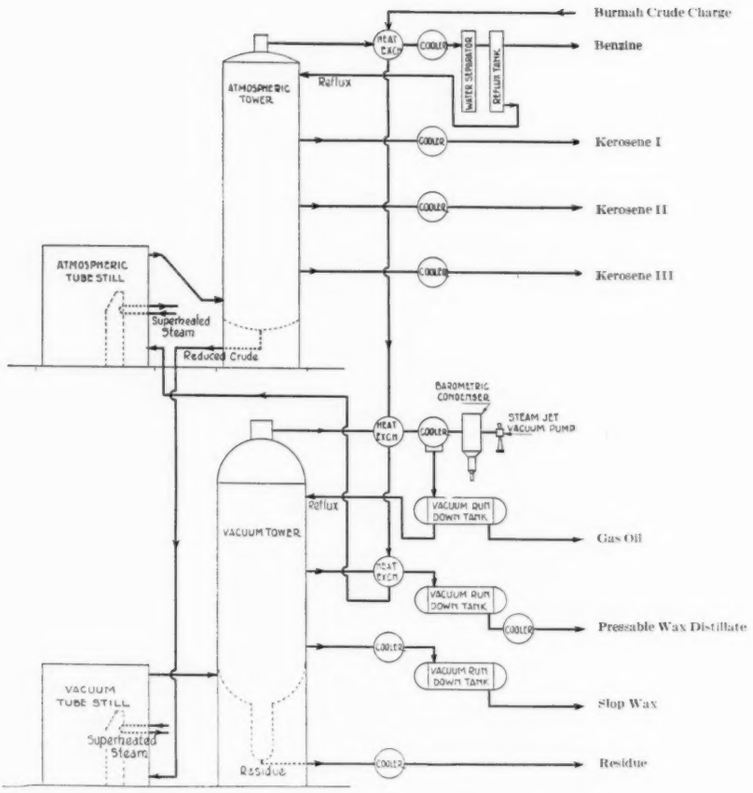

Flow chart of Burmah's new unit at the Syriam refinery.

work reduces total amount of steam required. Superheated steam also is desirable because it does not cool the oil or vapors within the tower.

The unit was erected in a limited space in order to take advantage of existing buildings in the refinery. The site selected for the new distillation unit is between a railroad track and a long narrow building suitable for the pump house and control room. The space was relatively wide but of shallow depth between the track and building. Two towers were therefore installed between the stills instead of in their usual position behind the stills. Vacuum unit was placed on the left and atmospheric unit at the right. Stacks serving the two stills were located at the extreme ends and were connected to the stills by underground flues. Heat exchangers, condensers and coolers are all of the shell and tube type and are placed between the pump house and the fractionating towers. The entire arrangement has been made compact without sacrificing accessibility.

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European Cracking Expansion

(Continued from page 281)

expensive, and second, even if expense did not matter it would be impossible to obtain gasoline of that character in sufficient volume without wasteful processing of crude oil. Furthermore it does not possess to sufficient degree today the all-important anti-knock quality.

It is also obvious that benzol, as in the United States, will become less and less a factor in motor fuel supply as the number of cars increase. Production of benzol is practically static, while the number of automobiles demanding fuel is increasing rapidly. Some years ago, benzol was a considerable figure in the American motor fuel field, but today it is negligible because demand has far outrun supply, its price is relatively high, and its use is no longer necessary.

The answer to the growing motor fuel problem in other countries will be the same as the answer has been in the United States; that is, wider use of the cracking process. In fact, the increase in production of cracked gasoline in the United States has been out of all proportion to the increase in number of automobile registrations, as shown by the accompanying table. While the automobile registrations increased only about fourfold between 1919 and 1930, the production of cracked gasoline increased about twenty-fold.

Cracking experts can supply the design and knowledge by which a refining industry can be built up in any nation regardless of whether that nation possesses deposits of crude petroleum or not. One method which offers excellent possibilities and one which has been adopted by some nations, is the construction of large systems of interconnected, underground reservoirs of concrete for storage of purchased oil and installation of cracking units at locations convenient to the reservoirs to convert these oils into high grade motor fuel.

Such a system of reservoirs makes it possible to purchase raw materials for cracking, such as heavy crude oil, fuel oil, gas oil or the like, when the market is low and to store them with safety from fire hazard and evaporation loss until they are needed for the production of motor fuel. From the standpoint of fire hazard as well as evaporation loss, the storage of heavy oils offers considerable advantage as compared with storage of finished gasoline.

Based upon the facts brought out in the course of this article it seems fairly safe to look forward to 1935 and make the following assumptions:

1. At the present rate of increase in automobile registrations outside of the United States, the total will reach 14,000,000 vehicles in 1935.
2. Assuming that these cars use an average of 500 gal. of gasoline per car year, that will make a total of 7,000,000,000 gal. per year or about 166,666,666 bbl. of 42 gal.
3. If the proportion of cracked to straight-run gasoline persists along the curve it is now following, at least 50 percent of the gasoline used by these cars will be cracked, which will mean a total of some 83,000,000 bbl. of cracked gasoline.

It may be assumed that the actual percentage of cracked gasoline will be far higher than indicated because the importance of anti-knock gasoline will undoubtedly increase greatly.

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UNITED States government contract for lubricants for Army, Navy, and other government branches for 1932–33, calling for over 1,600,000 gallons of lubricants, has been awarded to the Sinclair Refining Company, subsidiary of the Consolidated Oil Corporation.

Octane Over-Emphasis Lacking in England

While Appreciating the Value of Anti-Knock Quality in Motor Fuel, the British Motorist Has not been Led to Measure this Quality in Octane Numbers.

As a measure of anti-knock value, the importance of octane numbers for gasoline rating is fully realised in Great Britain, but this country is far from making them the only yardstick for measuring quality in the spirit sold to the motoring public.

To the scientific investigator, octane numbers are obviously a valuable formula for comparing one of the most necessary qualities of motor fuel; to the refining, blending and distributing companies they are equally important; but to the average British motorist an octane number, as such, means absolutely nothing.

This does not mean that the British public disregards the anti-knock value of the spirit it uses, for the relatively high average efficiency of the British car necessitates attention to this quality on the part of the owner. Mixtures aiming at eliminating detonation, principally through the addition of ethyl or benzole, have been on the British market for a number of years. What the motorist has never been educated to do is to measure anti-knock by an octane number, and to make that number the first consideration in his fuel purchases.

From the standpoint of research, British thought and action has followed very much the same lines as it has in the United States, and has been developed in close collaboration with the American bodies engaged in similar work.

The first steps in the attempt to classify and standardise anti-knock qualities were necessarily tentative, and it was not until last year that a generally accepted method was evolved. Various types of British testing engines were formerly used, including the Ricardo E.35 and the Armstrong, just as the Ethyl Gasoline Delco and the Series 30 were developed in America.

The only point in common between these engines was that they were all of the single-cylinder type. Methods of expressing results also varied greatly, anti-knock values being expressed in terms of an engine factor (highest useful compression ratio), in the case of the E.35 engine, and in terms of "knock ratings" in the Series 30.

Uniformity in expressing knock rating was finally achieved when the sub-committee, appointed by the Institute of Petroleum Technologists, fell in line with the American Cooperative Fuel Research Committee in adopting a mixture of pure heptane and iso-octane as an anti-knock standard and used the C.F.R. engine for determining knock rating.

Anti-knock quality is undoubtedly one of the most important qualities of gasoline, but octane numbers, even when completely reliable as a measure of performance in cars, would provide information on only one phase of quality, and looked at from the British point of view, there appears to be a strong tendency among United States distributors to exaggerate the value of octane rating at the expense of other properties. Among the more important of these are startability, good distribution and minimum oil diluting tendencies, all of which depend principally on volatility. General stability in use and storage are also attributes of a first-rate petrol of which octane numbers take no account.

The foregoing explains the caution so far displayed by the leading distributing companies in the British market towards the use of octane numbers in publicity. Anti-knock properties in petrol have, of course, to be placed before the public, and octane numbers are therefore watched carefully, with a view to maintaining uniformity over short periods. As has recently been shown in the Journal of Institute of Petroleum Technologists (Vol. 18, pages 329–349), there has been a steady rise in octane numbers of British petrols, over a long term, and this tendency still persists.

The octane numbers given, with the exception of that for 1931, are necessarily only approximate. Values for the years 1922, 1925 and 1928 are estimates based on conversions from knock results obtained in test engines other than the C.F.R.

Although anti-knock properties are being improved, there is no desire on the part of distributing concerns to over-emphasise octane ratings by making them a definite selling point.

A somewhat similar attitude to the subject is apparent among motor car manufacturers. Although anti-knock petrol properties are assuming increasing importance in determining engine design, the standard makes of car still aim at giving the ordinary motorist reasonably good performance on petrols generally available, and there is at present no definite evidence of a movement for increased compression ratios to take advantage of higher octane numbers. It is probable, however, that cooperation between motor engineers and petroleum chemists will increase in the near future, and the result of such cooperation may lead to changes in car design as anti-knock ratings are standardised. But such developments are hardly likely to become the primary factor in the manufacture of car engines.

Estimated Octane Numbers in England

Year of Average Sample (U.K.)	C. F. R. Octane Numbers	
	No. 1 Grade	Commercial Grade
1922	51	43
1925	55	53
1928	58	55
1931	68	61

In the absence of any pronounced emphasis on octane numbers on the part of the trade interests which always help to form public taste, it is not surprising that the British motorist, unless he takes a keen interest in all that concerns motoring, should ignore their existence. Developments up to the present time appear to have justified the caution on the part of the petrol companies which has left him in ignorance until octane ratings have been subjected to further research, or have been superseded by some more comprehensive measure of gasoline quality.

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Recently passed ordinance in the Straits Settlement requires that all liquids be sold in containers holding one imperial gallon or even fraction thereof. Until the present supply of American containers is used up it will be possible to mark the fraction of an imperial gallon represented by a U. S. gallon on the container: after a reasonable time nothing but imperial gallon containers will be allowed.

UNITED STATES

	Daily Production bbl.	Daily Runs to Stills bbl.	Gasoline Stocks bbl.	IMPORTS Total bbl.	IMPORTS Gasoline bbl.
Week Ending May 28	2,269,000	2,319,300	67,277,000	1,908,000	414,000
	334,300*				
Week Ending June 4	2,181,250	2,261,000	67,070,000	2,410,000	319,000
	349,950*				
Week Ending June 11	2,183,450	2,330,100	66,689,000	2,334,000	223,000
	330,400*				
Week Ending June 18	2,197,550	2,405,900	64,031,000	2,151,000	421,000
	331,050*				
Week Ending June 25	2,156,100	2,312,000	61,973,000	2,222,000	268,000
	331,800*				
Week Ending July 2	2,104,800	2,265,700	62,141,000	1,217,000	none
	328,900*				

Underlined figures indicate improvement in statistical position — decrease in production, runs to stills, gasoline stocks or imports.

*Production of the Rusk-Gregg field, East Texas.

Federal Tax Bill

THE tax bill which has been redrawn by the Senate Finance Committee, passed the House of Representatives and was approved by the Senate and signed by President Hoover, becoming law on June 6. The Manufacturers' Excise Taxes and the Miscellaneous Taxes were made effective June 21, while the revised Income Tax has been made retroactive to January 1. The new taxes affecting the oil industry directly are presented in the accompanying tables.

It is thus apparent that the oil industry and the related automobile industry will bear 24.4 percent of the total new taxation calculated to bring to the Treasury $1,118,500,000; the figures in the accompanying table do not include such indirect and minor items as increase in the corporation tax from 12 percent to 13.75 percent, tax on electric energy (three percent), tax on telephone, telegraph and cable messages, tax on checks and the postal rate increases. These figures, however, are misleading because in the cases of both industries, oil and automobile, the new taxes will be distributed between a large number of industries and individuals. Moreover these new taxes will indirectly affect primarily such companies and individuals as survive the depression best and hence should bear the brunt of Federal taxation. The American Petroleum Institute states in its objections to the new lubricating oils tax that it "imposes new burdens upon motorists and upon industry and business in general."

The effect of the tariff is already apparent in the above table indicating no gasoline imports for the week ending July 2—the first full week in which the tariff of 2½ cents per gallon on gasoline was effective. Imports of crude and fuel oil, while off 1,005,000, continued, having a tax of more moderate proportions to bear.

In the original form the new tax bill relating to gasoline and lubricating oils was phrased in somewhat indefinite terms, which allowed various interpretations. A large number of oil companies and jobbers presumed that the tax bill would affect only gasoline and lubricating oils at refineries and that any stocks the jobbers and retailers held on June 21 would not be assessable. Such interpretation naturally resulted in a flood of orders from jobbers and retailers who attempted to benefit from the new tax bill by storing large quantities of gasoline and lubricating oils, in some instances such accumulations reaching the requirements of several months. Some oil companies also transferred considerable volumes of the two products from their refineries to their marketing agencies. This movement inevitably resulted, first, in higher prices and, second, in reducing refinery stocks. For a time refineries were forced to refuse orders for delivery prior to June 21. The movement spread to the larger consumers, particularly those using quantities of lubricating oils, and by the middle of June refineries in northwestern Pennsylvania were cleaned of their stocks.

Abnormal Situation

WHILE temporarily creating a large demand at higher prices the tax bill presents to the refiners a difficult problem after June 21, when the demand from jobbers is expected to decline to a minimum for at least two weeks, possibly resulting in demoralization of refinery gasoline quotations. In order to prevent any serious reaction in the refinery prices a number of larger refineries are planning to shut down completely for ten days to two weeks after June 21, and in addition are planning to remain shut down for at least one week of each Summer month of the current year, partly in anticipation of the lower demand for motor fuel this year as indicated by the Federal Oil Conservation Board in its report of May 23. E. B. Reeser, president of the Barnsdall Corporation, announced that the corporation's refineries will be closed on June 20

Petroleum Industry Taxation

Effective June 21, 1932

	Duty	Expected Yield
Manufacturers' Excise Tax		
Lubricating oils	4 c per gal.	$33,000,000
Gasoline	1 c per gal.	150,000,000
Imported Oil		
Gasoline	2½ c per gal.	
Crude and Fuel oils	½ c per gal.	
Lubricating oils	4 c per gal.	6,500,000
Paraffin	1 c per 1 lb.	
Asphalt and Bitumen	10 c per 100 lb.	
Oil transported by pipe line	4% of charge	8,000,000
Sub-Total		$197,500,000

Taxes Indirectly Related to Petroleum Industry

Tires and tubes	2¼ and 4 c per 1 lb.	$33,000,000
Passenger automobiles	3%	32,000,000
Trucks	2%	3,000,000
Parts and accessories	2%	7,000,000
Sub-Total		$75,000,000
Total		$272,500,000

for at least ten days "to prevent an unsafe increase in gasoline stocks", and unofficially it has been indicated that the Empire Companies will partially close down their plants for about one week at the end of each month, unless the demand for refined products shows an upward trend.

Tax Bill Amendment

BEFORE its adjournment Congress realized that in its original form the Tax Bill allowed evasion on a large volume of motor fuel and lubricating oils, which were being stored by jobbers and retailers. Congress consequently amended the new tax bill in such a way that the levy of one cent a gallon on gasoline applies to owners who have in storage on June 21 more than 40,000 gallons (950 bbl.) of this product; and of 4 cents a gallon on lubricating oils to owners who have in storage on June 21 more than 1,000 gallons (23.8 bbl.) of such stocks.

Tariff Application

IN THE application of the manufacturers' excise tax and the new import duties it has been established that imported lubricating oils pay only four cents per gallon import duty, and that they are not further subjected to taxation in the United States, whereas the tariff on motor fuel is 2½ cents per gallon and this product is again taxed one cent per gallon, as is the domestic product, thus making the full duty on the imported motor fuel equal to 3½ cents per gallon.

The effect of the imposition of the tariff on petroleum and its products will be watched with great interest by the oil industry. The duty on gasoline is prohibitive and will reduce the importation of motor fuel into the United States to a negligible minimum. Duty on crude oil of 21 cents per barrel is not such as to prohibit its importation and refining in the United States. The duty on fuel oils, if consumed as such, is the least effective and the future imports into the United States will probably include much of that product for consumption along the Atlantic Seaboard. On June 21 the Standard Oil Company of New Jersey, partly to offset the new tariff, advanced the bunker fuel oil price 10 cents a barrel at North Atlantic ports, to 85 cents a barrel at Boston, New York, Baltimore and Norfolk, and to 80 cents a barrel at Charleston, S. C.; similarly Diesel oil was advanced 15 cents a barrel to $1.65 at all of these points.

Supply and Demand

INDICATED domestic consumption of motor fuel in April, 1932, averaged 1,008,000 bbl. per day, an increase of six percent over the daily average of March, 1932, but fully 11 percent under the motor fuel consumption in April, 1931, thus indicating for the first time a decrease in motor fuel demand of more than 10 percent. Export of motor fuel averaged 127,000 bbl. per day in April, 1932, an increase of 29.6 percent over March, 1932, but a decrease of nine percent under April, 1931. Total demand for motor fuel thus decreased by 10.8 percent in April, 1932, as compared with April of the preceding year. The imports of gasoline were unusually large during April and will probably continue at a high rate during May and during the first half of June, indicating an effort on the part of importers to store in this country large volumes of gasoline prior to the enforcement of the new tariff of 2½ cents per gallon on June 21.

On April 30 motor fuel stocks at refineries, terminals and in transit, reached 64,037,000 bbl., an increase of 1,117,000 bbl. over the previous month. At the current rate of total demand April stocks of motor fuel represent 56 days' supply, compared with 60 days' supply on hand the previous month.

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California Proration Secures Price Advance

IN CALIFORNIA the Standard Oil Company of California on June 13 offered to the producers of the State an advance of 25 cents per barrel in the price of crude oil provided that California production was held down to 476,700 bbl. per day. The offer of the company was made contingent upon the reduction in production prior to June 17, and subject to continuation of production within the allowable, new prices to be withdrawn if State's production should exceed 476,700 bbl. for a period of one week. The announcement of K. R. Kingsbury, president of the Standard Oil Company of California, which was in reply to the appeal for higher prices by the Executive Committee for Equitable Curtailment in the State of California, read in part:

> Because we believe in conservation and desire to afford your committee every opportunity for accomplishing its ends and because the next few months cover the peak demand for petroleum products, we now announce that this company will increase the price at which it offers to purchase crude oil 25 cents per barrel on 27 gravity Signal Hill crude oil, with a relative price for refinable crude oil of other gravities and for other fields throughout the State, provided a curtailment to the figure you have set of 476,700 bbl. daily in the State is accomplished as quickly as possible but not later than June 17 and that deficiencies in allowable production in a given field are not absorbed by excess production over allowables in other fields. The prices referred to will be offered 24 hours after the umpire certifies to us that these curtailment conditions have been met. These advanced prices will be withdrawn if the State's production for one week exceeds the allowable production indicated above.

By June 17 the total production in California was curtailed below the mark set by the Standard Oil Company of California, to 460,000 bbl., but such reduction was achieved by a few fields, a number of pools still producing in excess of allowables. On June 21 K. R. Kingsbury informed the Executive Committee for Equitable Proration in the State of California:

> We are advised that while the State's production has been curtailed to a point under the total allowable, a few fields are still producing in excess of the allowable fixed by your committee on the basis of a total of 476,700 bbl. for the State. You will recall that in our offer one of the conditions of the higher prices for crude oil was that no field should produce in excess of the allowable your committee had set for such field. The great progress your committee has made and the whole-hearted cooperation afforded it by the great majority of producers in the short time since our offer was made encourage us to believe that you will be successful in accomplishing the objective of your committee, and in order to afford an opportunity for doing so you may consider our offer as remaining in effect until 7 o'clock June 23. Our original proposal indicated that if the production exceeded the allowable in any one week the advanced prices would be withdrawn. We propose to extend this to a ten days' period.

Possible advance in the California crude oil prices and the continued proration in Mid-Continent oil fields have given rise to predictions that the crude oil prices in the latter area will again be advanced in the near future. In the light of the current domestic situation within the oil industry, as well as in the country in general, any increase in crude oil prices will be entirely unjustified at this time, and moreover will be extremely harmful to the industry itself by causing additional active drilling operations which have already increased by some 17.8 percent in the two months following the first increase in crude oil prices in the Mid-Continent area April 1. By June 23 the producers fully met the conditions of the Standard Oil Company of California and on June 25 the prices for California crude oil were increased by 25 cents per barrel. The Shell Oil Company and the Associated Oil Company met the new price schedules immediately. Increased prices bring quotations at Long

Beach, 26 gravity oil to 98 cents per barrel and Coalinga oil to 80 cents per barrel with corresponding increases elsewhere in California.

On June 27 California Standard raised the price of gasoline 2½ cents a gallon at all of its service stations. The new retail price is now 18 cents a gallon for first grade at San Francisco and 17½ cents at Los Angeles including the recently imposed Federal tax of one cent per gallon.

REFINERY gasoline prices improved very considerably during the first half of June under the impetus of jobbers' demand prior to the amendment of the tax bill which extended the tax to the gasoline stocks in excess of 40,000 gallons held outside of refineries. Quotations on June 18 were 5–5¼ cents per gallon for 58–60 U.S.M., 57 octane rating, in Group 3, Oklahoma, market; 57 to 64 octane rating, U.S.M., commanded 5¼–5½ cents per gallon and 65 and above octane rating grade, U.S.M., was quoted at 5½–5⅞ cents per gallon. Prices weakened after June 21, dropping to 5–5⅛; 5⅛–5¼ and 5¼–5½ cents per gallon respectively by June 26 with only nominal volume of gasoline being sold. Gulf Coast prices for export weakened to 4¼ cents per gallon for 58–60 U.S.M.

Natural gasolines stiffened slightly in sympathy, being quoted at 2½–2¾ cents per gallon for grade 26–70 (former AA).

Kerosene prices reacted somewhat, being quoted on June 26 in Group 3, Oklahoma, market at 2¾–3 cents per gallon for grade 41–43 w.w. Gulf Coast prices for export were quoted on that date at 4⅜ cents per gallon for grade 41–43 p.w.

Retail prices of gasoline were being advanced one cent per gallon practically throughout the whole country on June 21 in order to take care of the new Federal tax.

Crude oil prices remained without change east of the Rocky Mountains.

Texas oil and gas conservation and proration measures, as enforced now by the Texas Railroad Commission, have been thrown open to attack by the latest three-judge Federal Court decision, rendered on June 10 at Austin, voiding the State's Common Purchaser Statute as applied to natural gas.

The State will appeal the case to the Supreme Court of the United States.

The opinion of the three-judge court is definitely limited to natural gas, the common purchaser statute as affecting crude oil having been definitely declared to be not affected by this latest decision.

Common Purchaser Act on Gas Voided—Texas

REGARDLESS of whether the new decision will eventually affect crude oil proration, its effect on natural gas reserves of the Texas Panhandle, where the suit originated, will be destructive. The decision means that the plaintiffs, Texoma Natural Gas Company, Panhandle Eastern Pipe Line Company, Texas Interstate Pipe Line Company, Cities Service Gas Company and North American Oil and Gas Company, will be allowed to withdraw their own natural gas production only, leaving the offset leases without any connections whatsoever, thus draining such leases without any remuneration to their owners. According to a statute now enforced in the Texas Panhandle the use of natural gas there is restricted to supplying heat, light and power, and the statute prohibits the wastage of gas run through casinghead gasoline plants, which, after recovering the natural gasoline, permitted billions of cubic feet of dry gas, containing enormous heating values, to escape into the air. The new decision leaves the Texas Panhandle gas well owners no alternative outlet but through the natural gasoline plants, and if the decision of the three-judge court is sustained by the Supreme Court, the gas conservation statute will not be enforceable, being confiscatory in nature under the new ruling. Consequently a huge waste of natural gas will again result. As anticipated above, Fred Upchurch, assistant attorney general, on June 18 ruled that the Texas Railroad Commission has a legal right to issue permits for utilization of natural gas by producers for purposes other than light, power and fuel, thus clearing the way for reopening of a number of casinghead gasoline and carbon black plants in the Texas Panhandle, and incidentally authorizing the attendant huge wastage of dry gas.

The Texas three-judge decision is of great importance to other States, since, as was reported in the preceding issue of WORLD PETROLEUM, the State of Kansas is at this time working on State-wide conservation of natural gas reserves on the "common purchaser and proration" principle.

ON June 21, 1932, Governor W. H. Murray of Oklahoma transferred the enforcement of proration orders in the Oklahoma City pool from the Corporation Commission and from the privately supported and paid State's umpire office of R. M. Collins to the semi-military proration board in complete charge of Lieutenant-Colonel Cicero I. Murray.

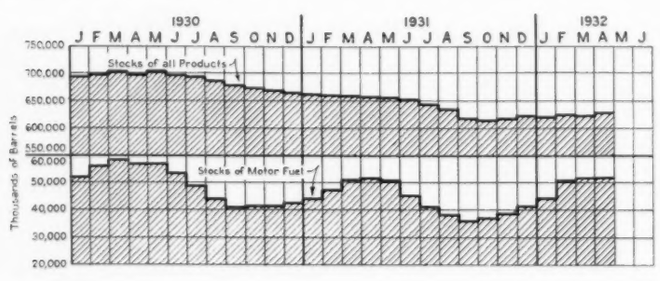
The executive order extends the military zone to all tanks and pipe lines; it places 30 officers and privates of the national guard to patrol the Oklahoma City field day and night; it requires installation of meters on all pipe lines; it provides for a special levy ("not as a tax but as an expense for such police and military regulation of the field, wells, pipe lines, storage tanks, and other means of producing, refining and transporting") of one-fourth of one cent per barrel for maintenance of troops in the field and it also fixes a penalty of shutting down wells of the operators disobeying the orders of the Corporation Commission and of the militia.

The Corporation Commission under the new order continues to maintain its power over conservation of natural resources, and it will continue to hold hearings to determine market demand for crude oil and fix corresponding allowables.

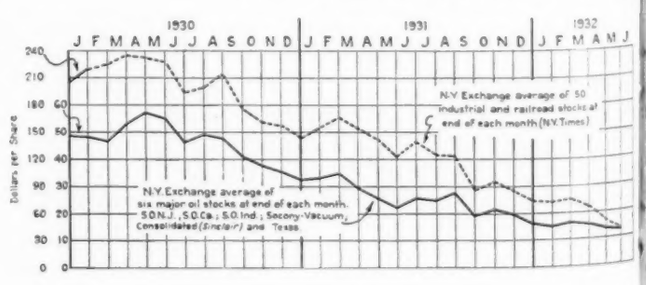
The new order was based on charges that much crude oil was being taken out of the field by certain companies in excess of their allowables and in consideration of the fact that "the Corporation Commission has no authority to enforce its orders other than to fine as for contempt, and grave doubt exists that it has this authority, but, if so, this, in effect, is but to license the violation of the law." Recently Wilcox Oil and Gas Company was charged with overproducing 699,000 bbl., and the Marshall Oil Company was accused of overproducing 57,000 bbl.; the first company shut-in its wells voluntarily pending the decision of the corporation commission, while the second company's wells were shut-in by the order of the commission supported by the notice from the military command in the field.

The action of the Governor has met

Relation of stocks of all petroleum products to gasoline stocks.



Six major oil stocks in relation to 50 industrial stocks on the New York Stock Exchange.


1930
1931
1932
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J
N.Y. Exchange average of 50 industrial and railroad stocks at end of each month (N.Y. Times)
N.Y. Exchange average of six major oil stocks at end of each month. S.O.N.J., S.O.Ca.; S.O.Ind.; Socony-Vacuum, Consolidated (Sinclair) and Texas
Dollars per Share
240
210
180
150
120
90
60
30
0

with the approval of most operators, Wirt Franklin summing up the general opinion as follows:—"The executive power of the Governor has been brought to bear to force equitable proration among the operators. Drastic conditions existing necessitate courageous action."

New Labor Policy

AMOS L. BEATY, president of the American Petroleum Institute, in his speech in Tulsa on June 2 appealed to the oil industry to initiate steps to relieve unemployment by establishing shorter working days, or weeks, in order to keep the skilled workers employed and thus make a contribution to the general economic improvement in the country.

Mr. Beaty indicated that the decline in living costs from June, 1929, to June, 1932, has been fully 20 percent, whereas in his opinion the average decline in salaries and pay has not yet reached such a reduction.

The Shell Petroleum Corporation on June 9 followed Mr. Beaty's plan by transferring some 150 men with their families from its Wood River, Illinois, refinery to company's plants in East Chicago, Houston and New Orleans, the company paying the transfer expenses. Similarly at the Arkansas City plant Shell has re-distributed the reduced work between all its employees by arranging lay-offs for each man equivalent to one day per week.

On June 14 the Standard Oil Company of New Jersey announced, effective July 1, 1932, the inauguration of the new labor and employment policy based on the general principles laid down by Mr. Beaty on June 2. Fundamentally the new policy is not entirely an innovation in the United States, various other companies having attempted to introduce shorter days or weeks, or some kind of employment insurance, but most of them were forced to give up the more liberal plans under the stress of competition.

The details of the new plan of the Standard Oil Company of New Jersey are:

1. A normal working week of a maximum of five days, or its equivalent, to apply to employees in the Company's domestic operations, both salaried and wage-earning, now on full time or working more than five days a week. Each company shall determine for its various departments whether this reduction in working time shall be taken off currently each week or in one or more periods over the year.
2. (a) Hourly wage earners will continue to be paid on the basis of time actually worked.
   (b) Salaried employees, including salaried wage-earners, now on a five-and-one-half day schedule will go on a five-day basis, with a reduction in pay of one-eleventh. To the utmost extent practicable, those now working more than five and one-half days per week will go on a five-day basis, with corresponding salary reductions. However, this reduction to a five-day basis shall not affect salaries of $100.00 or less per month, nor result in a reduction below $100.00 for those receiving more than that amount.
   (c) Executives and others of the management will receive a reduction of one-eleventh in salary, even though continuing responsibilities make an actual five-day week impossible.
3. All reductions in compensation will be effective currently on the payroll even though the time off is taken in one or more periods.
4. If in any department or plant there be a surplus of employees even after the reduction of hours outlined above, a further reduction in the time schedule, with corresponding reduction in pay, should be made to keep the force and available work in balance; provided, however, that in no case shall an employee's working time be reduced to less than fifty per cent of full time.

The new short-week policy of the Standard Oil Company of New Jersey will apply to all of the company's domestic subsidiaries, affecting 43,000 employees.

Development in Lubrication

WILLIAM F. PARISH, former chief of the lubricating department of the Army Air Service, and Leon Cammen, consulting engineer, described at a recent meeting of the American Society of Mechanical Engineers their discoveries in the field of lubrication.

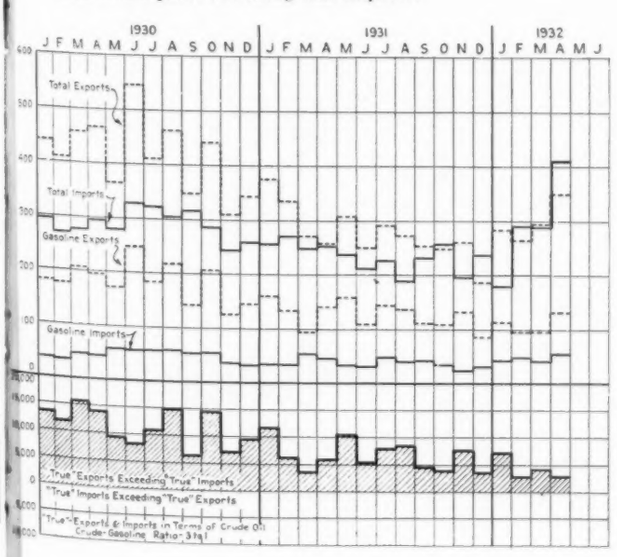
According to the formerly accepted theory of lubrication, three films of oil are involved; two of these are boundary films, clinging to their respective surfaces by molecular attraction; between the two is a so-called separating film.

The Parish-Cammen work proves the former interpretation to be definitely wrong. According to their tests lubricating oil penetrates metal, and that if a film of oil is completely wiped away as a shaft turns on its bearing, another and another appear. As many as 21 layers of oil have been wiped out in tests, and the last layer is left in the metal as a result of powerful chemical, electrical and magnetic forces and it resists all efforts to squeeze or throw it off. Though this action of lubricating oil was shown in practice first in these tests by Parish and Cammen, such action of the lubricants was suggested in theory long ago in England by Sir J. J. Thomson, and in this country by Dr. Irving Langmuir.

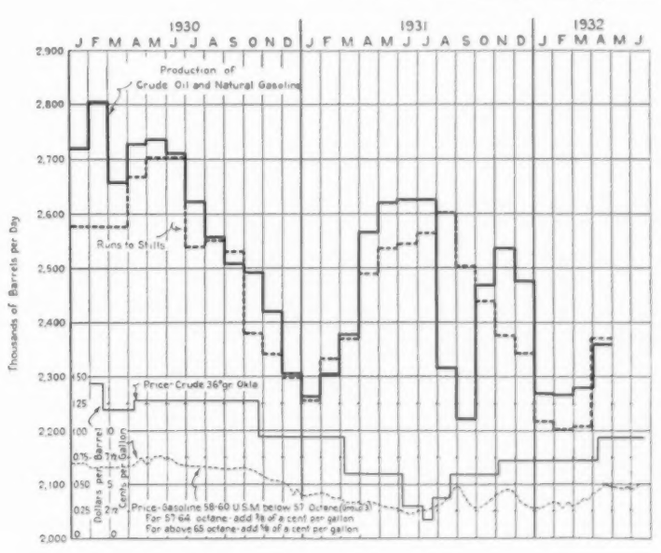
Railroads vs. Trucks

RAILROADS have entered into competition with motor trucks in handling refined products by lowering their rates in Oklahoma, Kansas and some points in Missouri. The new rate, approved by the Interstate Commerce Commission, was made effective May 26 and on short distances is 25 percent under the old rate. The new schedules are the same for one- or two-line hauls on all products, while

Total petroleum exports in relation to imports; gasoline imports and exports; and true exports exceeding true imports.


1930
1931
1932
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J
Total Exports
Total Imports
Gasoline Exports
Gasoline Imports
"True" Exports Exceeding "True" Imports
"True" Imports Exceeding "True" Exports
"True" Exports & Imports in Terms of Crude Oil
Crude-Gasoline Ratio-3 to 1

Production of crude and natural gasoline and runs to stills in relation to crude oil and gasoline prices.


1930
1931
1932
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J
Thousands of Barrels per Day
Production of Crude Oil and Natural Gasoline
Runs to Stills
Price-Crude 36° gr. Okla.
Dollars per Barrel
Cents per Gallon
Price-Gasoline 58-60 U.S.M. below 57 Octane-no 2%
For 57-64 octane-add ⅛ of a cent per gallon
For above 65 octane-add ¼ of a cent per gallon

World Oil Production—Official Figures

All figures furnished direct to WORLD PETROLEUM by Governments, except where otherwise specified

(Figures in U. S. barrels—Conversion ratio 7 bbl. = 1 ton)

Country	Total 1931	Daily Av. 1931	January 1932	February 1932	March 1932	April 1932	May 1932	Daily Av. 1932
United States	850,275,000	2,329,521	66,884,000	62,484,000	67,189,000	67,717,000	68,732,000[1]	2,190,800
Russia	156,342,900	428,957	13,059,900	12,194,000	13,852,300	13,101,200	13,437,200	432,000
Venezuela	120,069,462	528,337	9,939,027	9,469,873	10,398,514	10,000,000[1]	11,219,908	336,000
Roumania	46,333,945	123,510	3,780,000	3,750,000[1]	3,750,000[1]	3,750,000[1]	3,750,000[1]	123,500
Persia[2]	40,149,977	126,942	3,228,780	2,834,090	3,516,611	3,488,674	3,942,953	112,000
Mexico	33,038,853	90,517	2,869,177	2,761,064	2,967,842	2,922,309	2,924,956	95,000
Dutch East Indies	32,818,346	89,913	3,943,147	3,652,432	2,844,065	2,923,382	2,865,261	106,900
Colombia	18,237,190	49,965	1,533,969	1,401,554	1,668,508	1,655,922	1,682,223	52,200
Argentina	11,713,049	32,091	1,116,800	1,040,000	1,192,700	1,078,500	1,057,200	36,050
Peru	10,102,116	26,722	945,231	750,804	697,622	732,308	725,000	25,300
Trinidad	9,743,673	32,086	846,878	828,860	874,145	852,080	859,069	28,000
British India	7,830,101	21,452	750,251	698,645	719,337	700,000[1]	700,000[1]	23,500
Poland	4,397,760	9,146	351,365	324,100	334,495	336,231	340,200	11,100
Sarawak	3,338,472	12,049	210,748	200,102	197,050	191,282	187,859	6,500
Japan and Taiwan[1]	1,884,285	5,135	195,000	195,000	195,000	195,000	195,000	6,400
Egypt	1,845,938	5,057	138,796	137,431	142,275	151,305	146,489	4,700
Ecuador	1,750,633	4,796	126,406	111,361	126,024	133,844	139,389	4,200
Canada	1,583,339	4,338	96,912	90,841	97,484	95,585	95,221	3,100
Germany[3]	1,778,602	4,873	148,197	150,197[4]	262,528	141,780	150,000[1]	5,600
Iraq[1]	1,200,000	3,290	100,000	100,000	100,000	100,000	100,000	3,300
France	512,862	1,405	46,000[1]	46,000[1]	46,000[1]	46,000[1]	46,000	1,500
Others[1]	338,700	928	36,000	36,000	36,000	36,000	36,000	1,200
	1,355,285,293	3,713,138	110,346,584	103,256,354	111,207,500	110,348,402	113,331,928	3,608,750

[1] Estimate. [2] Anglo-Persian Oil Co. figures revised; fuel oil returned to the ground has been deducted. [3] A. P. I. [4] No production in Thuringia January 13 to March 10. [5] Including Thuringia. Sakhalin (Russian) included with Russia. Sakhalin (Japanese) included with Japan.

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heretofore the rate has been higher for two-line hauls. For 10-mile radius hauls the new rate is seven cents per hundredweight for refined products, as against the former rate of 11 cents on one-line and 13 cents on two-line hauls. The new rate graduates upward to 17½ cents for 140- to 150-mile hauls, as compared with the former rate of 18 cents for one-line and 20 cents for two-line hauls.

If the new rates will bring a large volume of traffic in refined products back to the railroads, it may be expected that similar reductions will be extended to other parts of the country.

Rusk-Gregg—East Texas

IN CONFORMITY with the Texas Railroad Commission's order establishing maximum allowable production from the East Texas field at 325,000 bbl. daily, the per well per day allowance for the first half of June was reduced to 54 bbl. and for the second half of the month to 51 bbl. The Texas Railroad Commission on June 23, in response to a petition presented by numerous producers changed proration regulations for field, allowing each well to produce 51 bbl. daily for a period of 60 days beginning July 1. This allowance will mean production of 360,000 bbl. per day by August 1 and 395,000 bbl. per day by September 1 at current rate of completions. The new ruling met with considerable criticism from the Texas Oil and Gas Conservation Association, E. A. Landreth of Fort Worth, W. S. Farish of Humble Oil and Refining, Wirt Franklin of Oklahoma City and others. The most objectionable feature of a set allowable for the next 60 days is that it will encourage drilling that might not have been undertaken if the lease owners knew that the 325,000 bbl. total field allowable would continue to be equally divided among all producers.

(Since these notes were written the strong protests against this move has caused the Texas Railroad Commission to abandon the new ruling and reestablish maximum allowable for the entire field at 325,000 bbl. daily—EDITOR.)

At the close of June there were in the Rusk-Gregg field 6,500 producing wells, an average of one well per 16.9 acres of the proven area of the field. The rate of new locations and completions continued high, each approximating 160 per week. Cumulative recovery from the field reached 165,000,000 bbl. by July 1, equivalent to 1,500 bbl. per acre of proven area.

The Texas Railroad Commission in its order of February 25 setting out rules to prevent excessive drilling by limiting locations to one well to 20 acres (page 171, April issue of WORLD PETROLEUM) overlooked the possibility of, or was not able to prevent, the subdivision of leases held by minor interests, which factor is causing at this time a large number of new locations and requiring an even greater number of offsets.

The number of water wells in the Rusk-Gregg field is semi-officially estimated at 86, or but 1.32 percent of the total. Wells showing water are appearing in considerable numbers in the North Longview sector of the field which so far has escaped the water menace. The unrestricted and rapid drilling campaign, poor control of the penetration of the wells into the sand and a large number of irresponsible operators in the field are all contributory factors bringing the day of serious water flooding much sooner than it would have come under conservative development.

The State of Texas leased to the Rhodes Drilling Company the Sabine River bed in the Rusk-Gregg field, that company submitting the most advantageous bid for the State. Under the contract 16 wells will be started immediately by the Rhodes Drilling Company and an eventual total of 114 wells is anticipated on the leased river bed. Such a campaign will require a large number of offsets, which in turn may force other locations to be drilled. The drilling of the Sabine River bed may thus cause as many as 400 wells to be drilled. The State's royalty on the river bed lease will be three-eighths, with an additional payment of $5,125 in oil per each well drilled.

Western Kansas

TWO ONE-WELL oil fields of Western Kansas saw completion of two producing wells each.

The more important extensions were in the Hollow field discovered late in 1931 (No. 39 on the WORLD PETROLEUM map published on page 107 of March, 1932, issue). W. C. McBride No. 1 Freesen in section 20–22S–3W had Misner-Hunton sandy limestone from 3,505 to 3,513 feet and was completed for an initial production of 3,500 bbl. per 24 hours of 40.8 gravity oil. Upon completion of this new producer the discovery well, the F. Hollow No. 1 Church Acre in section 20–22S–3W, was deepened from 3,509 to 3,513 feet, and increased its production from 500 bbl. to 1,250 bbl. The third producer in the field, the Stanolind Oil and Gas Company's No. 1 Froese in section 20–22S–3W, was averaging 300 bbl. per day from 3,496 feet and was to be deepened to the more prolific pay encountered in the first two completions. The Hollow pool has at this time appearances of developing into quite a prolific small oil field with excellent possibilities of deeper production from the Viola, Wilcox and Arbuckle formations. Skelly Oil Company is building a short pipe line to the field connecting it with the company's trunk line to Wichita.

In the Sharpe-Cress pool (No. 35), also discovered in 1931, two additional 1,000 bbl. wells were brought in, bringing the potential production from this field to 3,000 bbl. from 3 wells. The Sharpe-Cress field will be served by the Empire Pipe Line Company which is now laying a three-inch line about three miles long

from the field to a loading rack at Chase on the Santa Fe railroad.

Conroe—Montgomery County, Texas

DEVELOPMENT of oil production in the Conroe district of Montgomery County assumed much greater importance with recent completion of two oil wells. The following wells have been drilled in the new field to date:—

1. Strake Oil Corporation No. 1 South Texas Development Company. Discovery well, completed on December 13, 1931. Production found at from 4981 to 4991 ft., well making 15,000,000 cu. ft. of gas and 200 bbl. of high gravity condensate.
2. Heep Oil Corporation No. 1 R. L. Cartwright. 1.6 miles northeast from the discovery well, completed in April 1932. Production found at from 4970 to 5078 ft., well making 10,000,000 cu. ft. of gas and 125 bbl. of high gravity condensate.
3. Strake Oil Corporation No. 2 South Texas Development Company. One-half mile south from the discovery well, completed May 21, 1932. Production found at from 5002 to 5026 ft., well making 1,200 bbl. of 38.9 gravity oil through one and three-eighths inch choke. Temperature of oil 88 deg. F.
4. Heep Oil Corporation No. 1 J. R. Freeman. Two and one quarter miles northeast from the discovery well, completed June 8, 1932. Production found at from 5100 to 5121 ft., well making 1,100 bbl. of 37.1 gravity oil through one and five-eighths inch choke.
5. Heep Oil Corporation No. 1 M. E. Roberts. Two miles north from the discovery well, abandoned June 1932. Salt Water encountered at 5283 ft., total depth 5382 ft.

Present indications are that the two first wells stopped short of oil production and consequently they will be deepened into the oil pay within a few weeks. The present potential from the Conroe field's four wells, with the gas wells deepened, is around 10,000 bbl. per day, if wells would be allowed to produce unchoked.

At this time there are three tests being drilled in the field which will further determine its extent, the most important locations being that of the Heep Oil Corporation No. 1 Hamman, situated about one mile southwest from the discovery well, and due to be drilled in the beginning of July.

Geological control of the Conroe field is yet insufficient to determine the type of structure responsible for the oil accumulation. There is a possibility that a deep buried salt dome has been found; but even if such is the case the extent of the field and its importance will remain unknown until further drilling determines whether the production will be found only on the flanks of the dome, or whether it will overlap the whole of the cap, as in the Van pool. There is also a possibility that the field may be of a faulted type, and in this respect the outcome of the Heep Oil Corporation No. 1 Hamman is of considerable interest, that well being south of the highest wells at present in the pool. Production in the Conroe field is found in the Eocene formations.

While probably the Conroe field will become a major oil pool, it is not likely to be a very disturbing factor because several major oil companies control most of the prospective acreage, the Humble Oil and Refining Company (S.O.N.J.) leading with about 6,000 acres.

The Texas Railroad Commission will hold a hearing on June 25 in Houston in order to regulate the development of the Conroe field. The Commission at that time will issue well spacing limitations and will take preliminary steps for proration.

BASIL B. ZAVOICO

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RUSSIA

Official Figures of Soviet Oil Operations*

	Crude Production (bbl.)	Daily Average (bbl.)	Run to Stills (bbl.)	Drilling (feet)
January ..	13,059,900	421,300	11,927,882	152,532
February ..	12,194,000	420,482	11,428,900	193,185
March	13,852,300	449,197	12,866,700	240,433
April	13,101,200	436,707	12,737,200	250,854
May	13,437,200	433,461	13,057,800	262,295
Total ...	65,644,600	418,714	62,018,482	1,099,299

Revised quota 1932—191,800,000 bbl. or 525,400 bbl. daily average.

* Crude oil conversion ratio—seven bbl.—one ton.

Equipment Manufacturing

EXPECTED improvement in the oil industry has so far failed to materialize and it is quite likely that while the total for 1932 will exceed last year's figure, it will, however, be below the quota of 191,800,000 bbl. Judged by the present tempo of operations it may reach a total of about 170,000,000 bbl.

Lack of coordination between various divisions of the oil industry, between the oil industry and other industries and defective organization of transport and labor are regarded as the main factors which are causing delays in the accomplishment of schedules and plans.

Early in the year the Central Executive Committee of the Communist Party made a thorough investigation of the activities of the major oil trusts and decided to reorganize the management of the oil fields. It was found that there was too much centralized bureaucracy with inclinations toward right opportunism, which led to neglect of the principles upon which the reorganization of industries was based. The entire management and personnel were changed; but the same mistakes are being committed with the same delays of planning, negligence of accounting, and defects of technical management. Consequently operations are lagging behind plans from month to month.

Domestic plants which are building oil equipment are described in the following report given by one of the main controlling organizations of the oil industry:

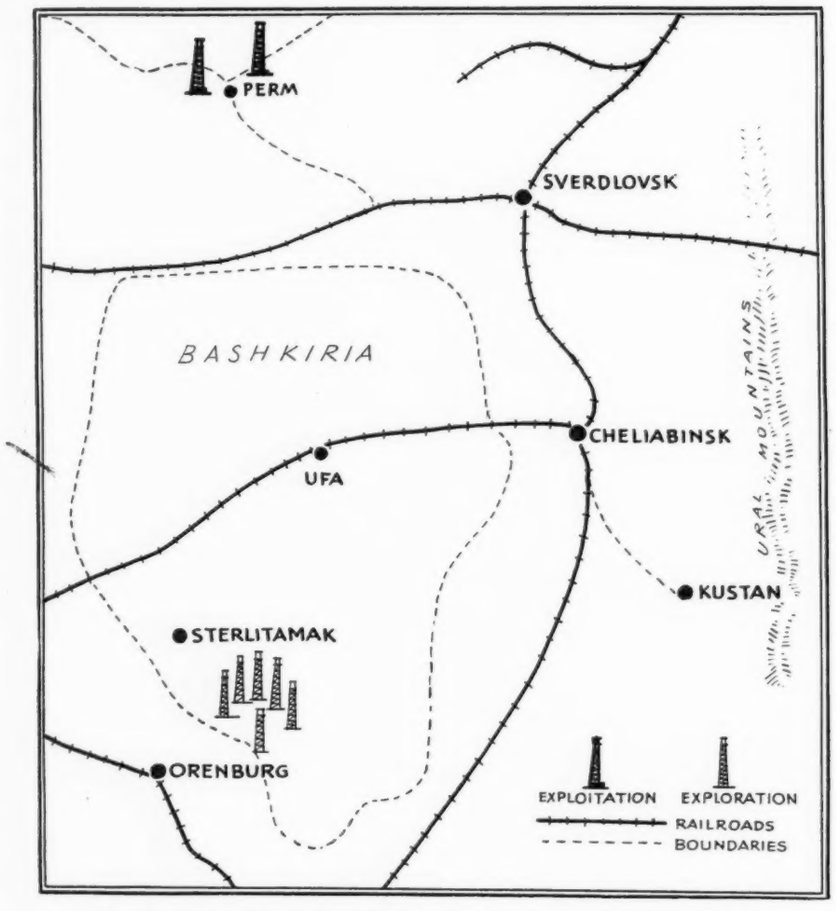
DZERSINSKI PLANT: This plant is building turbine drilling equipment as well as spare parts for all drilling systems. The plant is not in a position to adhere to plans because of lack of metal and other supplies. Dzersinski also has a division for manufacturing pumps, but so far the equipment turned out has been below the required standard of quality.

BAKU MACHINE SHOPS: These shops are building rotary drilling tables, hoists, swivels, transmission drives, crownblocks, etc.; lack of metals, especially castings, is delaying the fulfillment of a large percentage of orders. In addition lack of adequate machine tools and use of obsolete foundry equipment have reduced the position of this plant to almost second rate.

MONTIN WORKS: These works are handling all the repairs and spare parts for the Baku refineries. Of several hundred spare parts manufactured by these works over 300 items had to be rejected as unfit for use and the larger proportion of the rejects were originated in the foundry, where lack of skilled mechanics and poor management are responsible for the poor showing.

RIKOFF PLANT: This plant is devoted to the manufacture of all types of drilling bits and particularly fishtail tools. Report indicates that the output of fishtail tackle has been fulfilled almost 100 percent in excess of the plan. All other types of drilling tools however have been neglected and in the case of couplings, tool joints, pipe elevators and other pipe lifting accessories arrears of as much as 50 percent are apparent.

Disorganization of transportation and lack of transport facilities continue to hamper operations and react on plans of industries depending on oil as fuel.



Bashkiria Republic in U. S. S. R., where the opportune discovery of a small flowing well has given rise to optimistic predictions in Moscow.

Baku-Astrakhan transportation plan called for over 1,000,000 tons tanker capacity and about 1,700,000 tons tank car capacity (about 141,000 tank cars). There are over 20 percent arrears in the movement of oil products and this naturally affects storage facilities. Tank car delays cause demurrage of tankers of which the Volga division reports over 4,000 hours. Some of the barges plying the Volga have reported 318 hours of demurrage at Saratoff and at other places demurrage amounted to five days. Volga transportation plans have been fulfilled at the rate of 55 percent as about 30 percent of the barges are reported under repairs.

Exploration

WHILE lifting tools from a well in Kala (Apsheron Peninsula) at a depth of 750 meters a powerful gusher was opened flowing a stream of gas 100 Atm. pressure together with water and oil. During the first 24 hours a quantity of about 5,000,000 cu. meters of gas was produced. Prof. Golubiatnikoff believes Kala will become an important field as the geological structure is promising. The area is about 13.5 km. long and 5 km. wide.

At Mirsaani—Gruzneft oil fields (Georgia)—a new gusher has been brought in opening a new oil horizon at a depth of 450 meters. A stream of oil and gas flowing eight meters high produced 25 tons of oil during the first 10 minutes.

The discovery of a new oil area in the Bashkir Republic has been confirmed. At Ishimbayevsk in the Bashkiria a wildcat has been opened with a powerful gusher which flowed for five hours continuously yielding a liquid and gas which contained between 10 and 70 percent of pure oil. The area has been flooded with oil and measures are being taken to build tankage to receive the bulk of production. Two million roubles have been appropriated to drill 10 more wells. Ishimbayevsk is on the western incline of the Urals near Sterlitamak between Orenburg and Ufa. There are no accurate estimates as yet of the resources but indications point to large deposits.

Construction

AT TUAPSE a new coke installation has been put into operation producing ashfree coke of high quality.

An iodine plant has begun operation on Cheleken Island. The initial output was 10 kg. of iodine per day, which will be enlarged gradually to 25 kg.

Azneft of Baku has enlarged its asphalt installations. The 1932 plan calls for an output of 156,000 tons of asphalt necessitating reconstruction of all plants. Recently an installation was completed for 240 tons of asphalt per day and during the second half of May the Stalin plant completed an installation for an additional 200 tons of asphalt per day. The Stalin plant will further enlarge the output of asphalt with the completion of the 5 units which are to be erected within its area.

The Navigating Collegium of the Secretariat for Navigation has taken cognizance of the importance of the reorganization of the Baku shipping facilities and of transferring the oil terminal from Baku to Kara Tepe Bay. This Bay is at a distance of 45 km. from Baku and a pipe line from the Baku refineries to the terminal at this bay will be built. Construction of an oil terminal at this bay will shorten the navigating distance by about 82 miles of water ways thereby increasing the capacity of the tanker fleet by about 20 percent. The construction program must be started immediately in order to have actual building under way not later than the beginning of 1933.

Resources

PROFESSOR GOUBKIN has made a survey of the oil resources of Soviet Russia in connection with the second Five Year Plan. Pointing to the fact that the average potential yield of kerosene from crude in Soviet Russia is about 20 percent, he concludes that in order to obtain the tractor fuel required for the tractor depots of the country in 1937 a total of 53,000,000 tons of crude will be necessary. The total quantity of crude oil to cover domestic requirements of Soviet Russia and export requirements during the second Five Year Plan is estimated at 253,500,000 tons of crude.

Source of Total Crude Requirements for Second Five Year Plan

	Tons	Percent
Azneft	139,000,000	55.0
Grozneft	62,070,000	24.5
Maikop	25,150,000	9.9
Emba	9,840,000	3.6
Turcoman	5,090,000	2.2
Sakhalin	4,950,000	1.9
Georgia	2,850,000	1.2
Middleasia	2,620,000	1.1
Daghestan	950,000	0.6

Prof. Goubkin believes that extensive exploration will have to be carried on in order to insure the necessary locations for the production of crude required.

Prof. Goubkin has divided the resources of the quoted regions which are estimated at 1,500,000,000 tons under five heads: 1) Prepared, 2) Explored, 3) Visible, 4) Expected, 5) Possible.

Estimated Distribution of Soviet Resources

	Million Tons	Percent
Prepared	165	11
Explored and Visible	206	12
Expected	275	14
Possible	1,020	63

The first two groups thus cover about 65 percent of the quantity required for the period of the second Five Year Plan and the three last groups cover about 80 percent of the quantity. It will therefore only be necessary to explore and drill known locations in order to be able to transfer the resources of each category into a higher grade. This would be required to the extent of about 90,000,000 tons and the entire quantity required would be covered. Prof. Goubkin further points out the importance of increasing the exploration and drilling activities in the old fields in order to shape out deeper structures and horizons and in the new fields in order to open up new locations.

J. WEGRIN

viet Petroleum Exports from Black Sea Ports
First Quarter 1932

	Gasoline	Kerosene	Lube oil	Fuel oil	Total
land	468,852	515,951	65,544	371,212	1,421,559
many	639,662	67,241	101,673	287,963	1,096,539
ce	636,503	18,551	32,968	535,001	1,223,023
y	506,505	91,135	10,809	1,136,387	1,744,836
n	613,725	5,049	9,393	122,997	751,164
ium	379,316	7,897	117,200	208,835	713,248
key	14,272	10,808	....	119,698	144,778
t	11,360	65,944	....	206,746	284,050
a	....	239,391	7,003	52,882	299,276
dinavia	142,870	....	....	119,681	262,551
a	63,675	75,872	....	....	139,547
land	120,371	8,338	....	47,871	176,580
an countries	34,750	132,101	10,445	....	177,296
ther	145,961	27,138	....	529,248	702,347
	3,777,822	1,265,416	355,035	3,738,521	9,136,794

port of oil products from Soviet Russia in April amounted to 600 tons of which 166,200 tons were gasoline and 204,330 tons e fuel oil, the balance of 137,070 tons were kerosene, lubricating and other products.

Gasoline Production in U.S.S.R.

	1930		1931		1932*	
	Tons	Percent	Tons	Percent	Tons	Percent
ight run gasoline from crude	1,566,800	94.3	1,780,000	78.6	2,284,200	74.9
oline from natural gas	55,100	3.3	79,900	3.5	105,000	3.5
ked gasoline	39,200	2.4	406,600	17.9	658,200	21.6
tal	1,661,100	100	2,266,500	100	3,047,400	100

anned production.

MEXICO

Relief Program

AS THE Mexican petroleum industry's depression has aspects different from those characterizing this condition of oil activities in other countries, means adopted for its solution must necessarily differ from those employed abroad, argues the Ministry of Industry, Commerce and Labor in a review of the national oil situation it has just issued. The survey stresses the necessity for expanding domestic consumption in view of the anticipated appreciable decrease in petroleum sales to Mexico's best customer for these products, resulting from elevated import tariffs enacted by the United States. The review contends that means taken by the Federal Government to assist the oil industry are adequate, and remarks, in part, as follows:

Owing to the fact that the world petroleum depression has had great repercussions in Mexico and oil activities have been very seriously restricted in this country, these problems have been conscientiously studied. . . . This Ministry has formulated a program of action which it is urgent to develop in this matter in accord with supreme national interests.

There has not been any oversaturation of petroleum supplies in Mexico as has happened in other countries, especially the United States. In Mexico, prices have never been excessively low for consumers, nor have they reached the absurdly low levels they attained in the United States. Prices in Mexico have been so high for the public that they have handicapped our industrial and agricultural development, and have even indirectly permitted aggravation of the devastation of our forests. (Charcoal is used to a very considerable extent for household and other fuel in Mexico City and various other Mexican cities).

As the law establishes that the petroleum industry is exclusively under Federal jurisdiction, we do not have in Mexico the problem or necessity of obtaining interstate agreements or uniform principles of exploitation, nor do we require such laws for that subject. That is why this Ministry's program does not really tend to the restriction of activities, but rather to "procure a rational volume of normal production," taking into consideration "the rôle this source of national wealth must play in national economy." It also propounds equilibrium of "forces that move our petroleum industry, allowing national private enterprises to have access to it, and creating a semi-official organization of support and relation." Finally, it is proposed to "guarantee the present and future supply of the domestic market by means of explored reserves."

With this object, among measures that are in project are those for clearing away obstacles to the development of our industry by using all legal means, but demanding that the enterprises fulfill in an effective manner the obligation established by the law in regard to the execution of regular works, and endeavoring at the same time "to reduce in a reasonable way, within prudence, the surface extension of concessions," with a view to remedying the problem of inactive fields. The solution proposed in our country presents favorable perspectives for petroleum industrialists and investors, as our market has been maintained in reserve and can absorb several times the volume that it is now supplied, if it is efficiently and economically attended. The establishment by the United States of a tariff against petroleum products, which makes it difficult, if not impossible, for foreign petroleum to enter that country, makes it urgent for us to effect measures that favor the expansion of our consumption as a remedy for the probable decrease that our exportation will soon suffer.

It is true that various companies, urged by a prospect which has become a reality, have made arrangements in their businesses and organizations in such a way as to find new markets for that part of their products which had heretofore been exported to the United States. However, we believe that it is not only necessary but economical to seek a market for those products within our own territory, for that measure tends to save expenses and supplementary charges. The Mexican petroleum program can be considered as a program of relief, in view of the fact that its realization means not a restriction of activities, but a reasonable development of our industry in accordance with our great national needs.

According to the review's figures, Mexican petroleum exportations were about one third greater during the first four months of 1932 than those made in the corresponding period of last year. The 1932 exports during the January to April period were 9,412,540 bbl. against 6,647,741 bbl. during the corresponding period last year.

Exploration

THE Ministry attaches considerable importance to the perforation of a well by the Ohio Mexico Oil Company on May 2 near Sabinas, Coahuila State, about 100 km. from the American border, along the railroad between Saltillo, the State capital, and Piedras Negras. This well produced gas at early stages, which indicates that oil exists in this section which heretofore was not considered to be in the petroleum zones. The review reports that 49 permits for well drillings were issued between Jan. 1 and May 10.

An extensive zone, bearing indications of petroleum deposits that apparently are of commercial value, was explored in Chihuahua State, reports a geological commission headed by Engineer Gonzalo del Vivar. The commission was sent to north Mexico to investigate reports that oil deposits existed in regions near the American border. The commission reports that oil deposit indications extend from near the town of San Carlos to a short distance from the international boundary. Engineer George Cummings, who headed a geological expedition in the region, reports that earth structures favorable for oil deposits were found in the north of Tamaulipas State and extending northwestward into Nuevo Leon.

Contract Annulment Denied

DENIAL is made by the petroleum department of the Ministry of Industry, Commerce and Labor to reports published by a Mexico City newspaper that the department will annul the greater number of contracts made between petroleum companies and oil land owners because these pacts give the companies the lion's share of proceeds from the properties. The newspaper also charged that the department proposes systematically to deny permits for exploitation, to which the department's statement answered:

> This Ministry will continue to govern its acts according to the law, and will continue to issue permits for drilling as it has been doing heretofore, if applications for such permits conform with the regulations governing these works.

The fact that the Federal constitution provides that the petroleum industry and associated activities be completely under the national Government's jurisdiction is considered in Mexico City oil circles to be an assurance that the industry will not be affected by the radical Vera Cruz state expropriation law. These oil circles incline to the opinion that this constitutional federalization of their industry and kindred activities will mean the adoption of a "hands off" policy on the part of the Vera Cruz State Government in regard to the functioning of petroleum companies and oil works in that commonwealth.

DOUGLAS GRAHAME

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CANADA

Imperial Oil Report

REFLECTING conservative and constructive management the annual report of Imperial Oil, Ltd., shows the company's dividend to have been well earned. Earnings almost equal to last year and sufficient to meet all charges and permit an addition to surplus of almost $5,000,000, together with the maintenance of the excellent liquid position of the company, are also highlights of the report. Net profit, after all deductions, available for distribution on the one class of stock outstanding amounted to 68.16 cents per share as against dividend requirements of 50 cents. These earnings compare with 71.61 cents per share in the previous year.

Current assets and liabilites show corresponding decreases. Working capital is only slightly less, and there is a very marked improvement in the ratio between current assets and current liabilities, and the very excellent position of the company may be noted from the fact that cash on hand is nearly three times as great as the value of current liabilities.

Mr. C. O. Stillman, president, in his address to shareholders remarked that reduced earnings were due to lower prices for products and to a further contraction in the gross volume of sales. Earnings, however, did not reflect the full extent of the difficulties encountered, which were offset to an important degree by a program of economy based upon further advancement of process methods. Mr. Stillman notes improvement in the company's products, and points to a cooperation with the west in making gasoline available at a lower price than the imported product.

Imports

IMPORTS of crude into Canada during April were down considerably compared with March, being 1,101,859 bbl. compared with 1,932,433 bbl., and 1,365,801 bbl. in April of 1931. Gasoline imports during April totaled 171,147 bbl. compared with 157,323 bbl. in March, and 255,154 bbl. in April 1931. Of the April imports, 93,291 bbl. originated from the Dutch West Indies.

Petroleum Industry in 1931

RETURNS covering the industry during 1931 are yet only preliminary; but probably will not be materially altered when the revised figures are available. On the basis of the returns at present available Canada's production of petroleum during 1931 was 1,537,000 bbl. Total imports of petroleum and related products were valued at $40,632,795, compared with $66,619,649 in 1930. In 1931 crude accounted for approximately 55 percent of the imports.

New Developments

THE rather rapid development of the refining industry in Canada is attested by the fact that, in addition to the new plant in Montreal East, The Shell Oil Company have announced that they will build the first unit of a million dollar refinery on Burrard Inlet, Greater Vancouver, at once. The first unit will refine between 2,500 and 3,000 bbl. of crude daily.

The Quaker State Oil Refining Company has formed a Canadian subsidiary, and is establishing a blending plant in Toronto to handle its Canadian business. The company has leased 5,000 sq. ft. of floor space in the plant of the Warren Bituminous Paving Company, and it is proposed to start production as soon as possible.

Work has commenced on three new wharves to provide dockage facilities for tankers.

Canada's first butane plant was started at Three Rivers, Quebec, during the month.

R. C. ROWE

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HOPE for the success of international negotiations directed toward stabilizing the petroleum industry were expressed by Eng. Robert Schwarz, editor of the German journals, PETROLEUM and TÄGLICHE BERICHTE ÜBER DIE PETROLEUMINDUSTRIE, in a lecture at the Berlin-Charlottenburg Technical High School where he spoke on International Oil Economics at the invitation of the Society for Deep Drilling Engineering.

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BOARD of Directors of the Royal Dutch Company has announced a general meeting of the shareholders in Amsterdam on June 30.

Foreign Oil Legion

CHARLES E. ARNOTT, president of Socony-Vacuum Oil Corporation, and Harold F. Sheets, director, sailed from New York, June 22, on the ILE DE FRANCE. Mr. Arnott and Mr. Sheets are attending the international oil stabilization conference being held in Paris.

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J. A. Jameson, engineering-director, Iraq Petroleum Company.

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SIR EDWARD MANVILLE, chairman of Phoenix Oil and Transport Company, Limited, has returned to England from his annual tour of the company's properties in Roumania.

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J. CUTHILL, works manager of Oil Well Engineering Company, returned to London from a visit to Trinidad, Mexico and Venezuela at the end of May.

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CAMPBELL M. HUNTER, petroleum technologist, of London, is on a visit to Canada.

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FRED KAY, Pan American Foreign Corporation, is on a business trip through Mexico.

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R. G. STEWART, director of Standard Oil Company (New Jersey) and president of Pan American Foreign Corporation, returned on June 30 from Europe, where he spent about a month in London, Paris, and Berlin.

EMANUEL NOBEL, at one time a well-known figure in the European petroleum field, died at Stockholm recently. He succeeded his father, Ludwig Nobel, as head of Nobel Brothers and Company, pioneer Russian oil firm, and was active in the formation of the Russian oil trust before the war. The Nobels have had a long and distinguished career in the petroleum business, having built the first tanker and the first tank car used in carrying oil. Emanuel Nobel was 72 years of age. He has been living in retirement for some time and was paralyzed during the last two years of his life.

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RUSSIAN delegation to the International oil stabilization conference left New York, June 7, on the LEVIATHAN after being entertained by Charles E. Arnott, president of Socony-Vacuum, at dinner the same evening.

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Jules Meny, chairman of the pipeline committee, Iraq Petroleum Company.

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L. W. BERRY, field manager of Anglo-Ecuadorian Oilfields, is now in England on leave.

K. E. PETERSON, field superintendent of Maturao Oilfields, New Zealand, is returning to New Zealand via Canada after visiting Great Britain in connection with the purchase of material.

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A. F. DABELL, general manager of British Controlled Oilfields in Trinidad, recently arrived in London on leave.

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A. HENRY RICHARDS, B.Sc., civil engineer and chemist of the Apex (Trinidad) Oilfields, Ltd., is spending a four months' holiday in England and is expected to return to Trinidad about the end of September. Mr. Richards was one of the chief engineers responsible for the erection of the Apex casing head gasoline plant.

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G. H. Michler, managing-director, Compagnie Standard Franco-Americaine.

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J. S. MELLON, manager of the foreign department of the Byron-Jackson Company, returned to the United States, July 1, after spending about four and one-half months in Argentine oil fields.

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J. A. VAN WYNEN, vice president and general manager of Standard Oil Company of Pennsylvania is planning to retire on August 31 after 44 years of service in the sales end of the oil business during which he assisted in the organizing and building of the Standard Oil Company of Pennsylvania according to the LAMP.

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E. P. SENIOR, field manager of Compania Ferro-Carrilera de Petroleo, is in Great Britain on the company's business.

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COL. HOLLAND S. REAVIS, well-known student of petroleum affairs, has purchased the Mount San Angelo estate in Virginia and will make that State his home, retaining his New York office at No. 9 Gracie Square.

FINANCE

Paris: June

OIL share values have continued to sink during the past month, but fluctuations on Royal Dutch have been less violent than they were during the months of April and May. It is obvious that a dividend of six percent plus the directors reassuring report have had a stabilizing effect upon the Bourse.

As regards petrol prices there has recently been a decided improvement in the Parisian area.

A rise of one franc per five liter tin of gasoline was suddenly arranged and has been partly maintained; whether it is likely to last still remains to be seen. In some districts there are signs of the united front weakening.

A new cloud is now rising upon the distributing companies' horizon and their future does not appear to be a rosy one even in the eventuality of the second International Oil Conference arriving at some kind of an agreement.

They are now harassed by the French Government which has launched forth upon an intensive campaign of "alcoholization," that is to say that, regardless of future results, distributing companies are to be obliged to take over larger quantities of alcohol to mix with their gasoline. Motorists are requested, on grounds of patriotism, to buy this mixture and the manufacturers of alcohol assured of an ever-increasing if unwilling number of clients are intensifying their production with incredible speed. Where such a policy will lead France remains to be seen but for the moment it is causing great anxiety, inconvenience and loss to the distributing companies in this country.

AT THE shareholders' meeting held in Paris, June 1, directors of the Compagnie Française des Pétroles made some interesting statements concerning results obtained during 1931, that is to say that practically speaking, for the first time since the foundation of the company, they are tangible.

In Mesopotamia the construction of the pipe-line, which has recently been begun, is the solution to the problem of oil transportation to the Mediterranean Sea. Thirty-one productive wells have been drilled; but only the necessary number will be kept open to insure an average annual production of 4,000,000 tons of oil. According to the directors of the C.F.P. the only limits to the capacity of the Iraq oilfields appear to be those occasioned by the difficulties of transportation.

With regard to the formation of the Mediterranean Pipe-Line Company, Ltd. (October 1931), the C.F.P. has obtained an equal number of shares in this company to those it holds in the I.P.C. The new company has benefited by all the agreements signed with regard to the areas through which the pipe-line is to pass, the acquisition of the necessary land has been made (for the greater part) and orders have been given to different European firms for the necessary pipe. Workshops are being organized on the spot.

IN FRANCE, the execution of the program to erect refineries is well under way and the one at Tancarville in the northwest should be ready in the spring of 1933. The construction of the second refinery on the Etang de Berre will be commenced later.

IN SPITE of a policy of rigid economies the Compagnie Industrielle des Pétroles has been severely hit by existing conditions on the distributing market and announces losses amounting to Fr. 13,665,807 as compared with a profit of Fr. 10,837,729 in 1930. As a result, the company's ordinary shares have fallen very low and now only average about Fr. 50–52.

The construction of the company's refinery at Frontignan is under way and will, when it is finished, have an annual capacity of 150,000 tons.

LIKE most French companies which have undertaken oil research work in foreign countries, the Société Française de Recherches au Venezuela appears to have met with reverses. After having completed the exploration program, decided upon in 1930, during the course of 1931, research work was abandoned and the European staff was recalled.

No profit and loss account has been published for 1931. A plain statement of facts has been issued to shareholders informing them that expenses amounted to Fr. 93,812 against Fr. 87,817 last year.

PETROLES ESSENCES ET NAPHTES now affiliated with the Société Anonyme Pechelbronn announces that losses for 1931 amount to Fr. 4,078,947 making a total deficit for 1930–1931 of Fr. 9, 446,913.

THE SOCIETE GENERALE DES HUILES DE PETROLE has announced that no dividend will be paid to shareholders this year.

After placing Fr. 30,793,961 to depreciation, over Fr. 10,000,000 to balance of interest due, and having paid expenses etc., net profits for 1931 only totalled Fr. 1,004,099 as compared with Fr. 9,026,372 in 1930.

There is considerable similitude between the sums figuring under the different head-

Paris Bourse Prices

1931 Div.	1931 Par.	Share	May 15 to June 15 First	High	Low	Last	Change	Position on June 15, 1931
30 Lei	500 Lei	Astra Romana	45	46	39	41	−4	94
....	500 Lei	Colombia	47	48	38	44	−3	66
50 Lei	500 Lei	Concordia	36	38	31	33	−3	54
....	500 Fr.	Cdré. Gén des Pétroles act	..	..	..	..	..	..
....	500 Fr.	Cdré. Gén des Pétroles part	..	660	601	640	..	850
....	500 Fr.	Franco Pol. Pétroles act	37.50	40	29	40	+2.50	52.50
....	....	Franco Pol. des Pétroles part	..	..	..	..	..	..
1 $	10 $	Franco Wyoming	151	162	121	136	−15	216
20 Fr.	500 Fr.	S. G. des Huiles de Pétrole act	180	205	168	185	+5	282
....	....	" " part	52	59	51	..	..	..
....	500 Fr.	C. Française des Pétroles	..	405	400	..	..	..
....	500 Fr.	C. Industrielle des Pétroles	..	..	..	..	..	800
70 Fr.	500 Fr.	Lille Bonnières Colombes prio	625	625	576	590	−35	765
45 Fr.	500 Fr.	" " ord	360	380	335	338	−22	505
....	500 Fr.	Malopolska act	16	17	12	19.75	2.25	28
....	....	Malopolska part	142	164	134	149	+7	145
....	....	Mexican Eagle	..	36	30	32	..	43
....	250 Fr.	Omnium Inter. des Pétroles	65	65	54	58	−7	102
50 Fr.	500 Fr.	Pechelbronn	406	406	320	321	−85	605
60 Fr. B.	500 Fr. B.	Petrofina	380	380	321	332	−48	440
240 Fl.	1000 Fl.	Royal Dutch	11950	12500	11125	12230	+280	20650
24 Fl.	100 Fl.	Royal Dutch 1/10	1200	1255	1126	1230	+30	2095
....	1 £	Shell	160	170	153	158	−2	294
25 Fr.	500 Fr.	Steaua Française	184	202	175	197	+13	160

ings of the companies' last two balance sheets except that the value of its stocks has depreciated considerably falling from Fr. 145,774,274, to Fr. 112,964,120. This, of course, is partly accounted for by the reduction in prices obtainable for petroleum products.

Equally sums due to creditors have augmented during the financial year passing from Fr. 87,773,844 to Fr. 127,620,321. On the other hand, sums due (bills payable) have been greatly reduced and now stand at Fr. 69,332,414 as compared with Fr. 150,736,218 in 1930.

Under the circumstances, one can consider the companies' position as latent; it is holding its own during this period of crisis and is not as badly off as some other companies.

THE position of a holding company in these times of crisis is not an enviable one, means of reaction are so limited. Thus, the Société Anonyme Franco-Wyoming which, owing to careful administration, was able to declare a profit of $653,964 for 1930, has been obliged to announce losses amounting to $276,613 for 1931.

Dividends received in 1931 only totalled $388,007 as compared with $822,582 in 1930 and the company has been obliged to write off a sum of $515,043 to balance losses sustained by the depreciation of its investments.

The whole of these amount to $5,630,-841 as compared with $9,920,036 in 1930 and now only comprise 63,700 Standard Oil of Indiana and 30,334 Standard Oil of New Jersey shares because, in order to reduce its current liabilities, the Société Anonyme Franco-Wyoming was obliged to sell 18,800 of the former company's shares and 38,000 of the latter's.

Amongst other holdings it still owns 300,000 McElroy Rauch shares, 703,000 Franco-Western Oil. Franco Central Oil only stands for $176,543 as compared with $187,800 in 1930, whereas the New Bradford Oil Company, Petroleum Trading Company and Produits Chimiques and Charbons Actifs Ed. Urbain have disappeared.

E. J. ANDRÉ

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London: June

REACTIONS to events in New York have provided most of the incident in the London oil share market during recent weeks. Anticipations that the World Oil Conference would be successful caused a slight upward movement at the end of May, which was assisted by some good dividend announcements from leading companies. The breakdown of the Conference left the market with very little support, and as it coincided with the announcement of less favorable company results, prices gave way sharply, Anglo Persian and one or two other important shares touching new lows for the current year. Hopes that something may still be accomplished in the way of international marketing agreements by conferences in Europe at a later date has since brought about a better tendency. Business however remains very quiet, and daily fluctuations reflect share quotations in New York, Paris and other overseas centers. Prices have improved partly by way of response to the general improvement in sentiment in the London stock market, engendered by the possibility of agreement on international indebtedness at Lausanne.

ALTHOUGH the market was frankly disappointed at the reduction in the Anglo-Persian dividend from 15 percent for 1930 to five percent for last year, normal and satisfactory development of the company's business is recorded in the annual report. Sales were well maintained, and numerous improvements were affected in refining and marketing. Low selling prices, however, were responsible for a decline from £4,648,580 to £2,318,-717 in net profit. Depreciation allowance is not stated, but in view of the traditionally conservative policy in this respect, it may be assumed that generous provision was made last year. The dividend of five percent on the ordinary shares was earned twice over, and the balance sheet again discloses a very strong position, with oil stocks, debtors, investments and cash showing a combined excess of £4,526,852 over current liabilities. Among the improvements and extensions to plant, two of the most important were the bringing into service of large cracking units at Abadan, and the commencement of work on a new refinery near Marseilles by the French subsidiary, necessitated by recent French legislation. An interesting feature of the report is the proposal to convert the company's share capital into stock, with the object of eliminating the clerical work involved in keeping individual share numbers. In proposing this step the Anglo-Persian directors are following a policy already adopted by a number of other big British industrial undertakings.

SIR JOHN T. CARGILL gave Burmah Oil shareholders a frank account of the outlook at last month's annual meeting. He pointed out that for the first time in its history, the oil industry is facing a declining trend in consumption, and indicated that a renewed advance in demand would depend on a removal of impediments to which world trade is now subjected. In the Indian market, in which the company is primarily interested, demand was declining under the combined weight of business depression, political unrest and unduly high taxation of the company's products. The only offsetting trade factor was the linking of the rupee with depreciated sterling, giving the

London Stock Exchange Prices

1932 High	1932 Low	Last Year's Div. % per Ann.	Share	May 15–June 15 First	High	Low	Last	Change
1 1/32	9/32	....	Anglo-Ecuadorian	5/16	5/16	9/32	9/32	−1/32
1 7/16	3 1/32	10	Anglo-Egyptian "B"	1 3/16	1 1/4	31/32†	1†	−3/16
2 1/16	1 3/16	5	Anglo-Persian	1 11/16	1 29/32	1 5/16	1 7/16	−1/4
9/16	15/32	20	Apex Trinidad (5s.)	9/16	9/16	15/32	1/2	−1/16
3/4	3/4	....	Attock	15/32	3/4	3/4	3/4	−3/32
7/32	3/16	5 *	Brit. Borneo (6s.)	3/16	7/32	3/16	7/32	+1/32
3/16	3/16	5 1/4	Brit. Burmah (8s.)	3/16	3/16	3/16	3/16	.....
3/32	1/16	....	Brit. Controlled ($5)	1/16	1/16	1/16	1/16	.....
1/4	1/16	....	Brit. Controlled Pfd. ($5)	3/32	3/32	1/16	3/32	.....
2 3/8	1 13/16	17 1/2	Burmah	2 9/32	2 3/8	1 29/32†	2†	−7/32
1 3/32	7/32	12c.	Canadian Eagle (No par)	1/4	1/4	7/32	7/32	−1/32
5/8	1/2	....	Creole (No par)	....	17/32	17/32	17/32	.....
1/8	1/16	....	Kern River (10s.)	3/32	3/32	1/16	1/16	−1/32
1 3/8	31/32	12 1/2	Lobitos	1 3/32	1 1/4	1 1/16	1 1/16	+1/32
1 3/32	1/4	6	Mexican Eagle ($4 Mex.)	9/32	9/32	1/4	1/4	−1/32
....	....	....	Pan American "B" ($50)	....	9	6	9	.....
1/4	5/32	2 1/2	Phoenix	3/16	3/16	5/32	5/32	−1/32
20 1/8	10 1/4	6	Royal Dutch (fl. 100)	13	13 15/16	12 1/8	13 3/8	+3/8
2 1/2	1 7/16	7 1/2 *	Shell Transport	1 23/32	1 27/32	1 1/2†	1 5/8†	−1/32
9/32	3/16	4	Steaua Romana	7/32	7/32	3/16	3/16	−1/32
1 13/32	1 1/8	5	Trinidad Leasehold	1 3/8	1 3/8	1 1/8	1 7/32	−5/32
3/16	5/32	....	Untd. Brit. of Trinidad (6s. 8d.)	1/8	1/8	5/32	5/32	−1/32
1 11/32	7/8	10	Venezuelan Oil Concessions	1 5/32	1 3/16	7/8†	29/32†	−1/4

Nominal value of shares £1 unless otherwise stated by bracketed figures.
* Denotes Tax-free dividend. † Denotes "Ex-dividend" price.
c. Denotes cent per share.

company some advantage over importers into India of oils produced in gold standard countries. Prospects for the current year are not promising, shareholders being informed at the meeting that the average price of kerosene, Burmah's principal product, is lower than in 1931, and that the excise duty will bear still more heavily on the company. Smaller dividends will also be received from the company's interest in Shell Transport and Anglo-Persian shares. Sir John, however, recalled that the management embarked on a "sound economy" campaign as long ago as 1927–28, and added that this had continued to effect increasing economy and efficiency in every department. This policy, and sound finance, were evidently the two major reasons for the good results reported in WORLD PETROLEUM last month. These results, and the strong position shown in the balance sheet, justify the chairman's confidence in Burmah's ability to weather current depression in the oil industry.

AS USUAL, the annual reports of the Royal Dutch Petroleum Company and the Shell Transport and Trading Company between them contain much useful information. They show that, owing to the leading part taken by the Royal Dutch-Shell Group in restricting output, its total production declined from 23,980,027 metric tons in 1930 to 20,532,758 metric tons last year. The 1931 figure represents little more than 10¾ percent of world output, compared with over 12 percent in the preceding twelve months. Reduction in the profits of the two principal companies last year was due to a considerable extent to the lapse of Great Britain from the gold standard, the Bataafsche Petroleum subsidiary alone having to charge the equivalent of about £4,000,000 against its 1931 profit in order to write down its sterling balances. Adjustments such as this would appear to account largely for the decline of nearly 70 percent in Royal Dutch profits, while Shell earnings, computed in low-value sterling, fell by under 50 percent. Both Shell and Royal Dutch appear to have distributed a trifling amount more than was actually earned, but full allowance had previously been made for depreciation throughout the chain of subsidiaries, and the strength of the group's finances is plainly evident from the balance sheet figures of the two principal partners.

DEDUCTIONS drawn by the market from the increase in the Lobitos dividend from 10 percent to 12½ percent were shown by the accounts for 1931 to have erred on the side of optimism. From figures given in the report, it appears that the Peruvian operating company, after paying no less than £171,764 in Peruvian Government taxes, made a loss of about £226,000 for the year to October 31, 1931, converting its previous credit at a profit and loss to a deficit of £126,195. The Lobitos tanker fleet was also less remunerative, but where charters expired, the vessels were kept employed by acceptance of rates covering bare running expenses. After deduction of all charges, including depreciation, the Lobitos net profit was £113,889, against £182,158 for 1930. No further allocation was made to reserve, but the undivided surplus is increased by £20,139, to £236,381. At the meeting, the chairman explained that the Peruvian company's loss had not been provided for in the parent company's accounts, as its productive capacity was unimpaired and a small increase in the price of crude oil would eliminate the debit balance in a short time, a considerable reduction being likely by next October. Taking a moderately hopeful view of ultimate prospects for the industry as a whole, the Lobitos board, although making no promises, hopes to distribute a reasonable dividend for the current year, and may again make an interim payment.

A RISE to ¾ in Attock Oil £1 shares at the end of May, due to the announcement that a new well had been brought in giving good initial production, was subsequently lost in anticipation of an unfavorable annual report. The relapse in the price of the shares appeared justified by the figures announced last month, a loss of £111,296 having been incurred on 1931 operations, compared with a profit of £70,211 for the preceding year. After taking credit for £22,298 from taxation reserve, and providing £55,000 for depreciation, a credit of £167,062 at profit and loss account at the end of 1930 was reduced to £23,064. Production of crude declined from 191,249 bbl. to 138,806 bbl. but sales were nevertheless slightly below potential output of refined products, whereas in 1930 stocks were reduced by sales in excess of the year's production. The deep drilling program, adopted some years ago on the exhaustion of shallow wells, was continued, but results at depth have been disappointing. The drilling campaign has now been considerably curtailed and every possible economy effected, and it is stated that costs this year should show considerable reduction. Despite the large cash resources still in hand, and careful management, the immediate outlook does not appear promising in view of the company's unfortunate recent experience with its property and the low prices for petroleum products in India.

ALEC H. DAY

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New York: June

THE stock market established a new low level of resistance early in June and after rallying moderately settled down for the most part to a desultory see-sawing movement that apparently pointed in neither direction. Along with the rest of the market the oils were weak early in the month and failed to recover to the closing levels of the previous month's table. Fifteen of the 31 oil stocks made new lows for the year, and only three showed plus signs for the period.

A number of industries have been temporarily affected by the inauguration on June 21 of many of the new tax levies recently enacted by Congress. The abnormal activity prior to this date, resulting from the desire to avoid taxes by stocking up ahead or by hastening the filling of consumptive requirements that would otherwise have been further postponed, has not been misinterpreted generally as being of particular fundamental significance. The attitude has rather been one of skepticism as to maintenance of business and industrial activity in the summer months.

Gasoline markets were stronger in response to the pre-tax demand of independent dealers and marketers, and despite an increase in refinery operations gasoline stocks as reported to the American Petroleum Institute declined more than 2,600,000 bbl. in the week ended June 18. Leading companies have increased service station prices to absorb the one-cent Federal tax and are hoping that the lull in independent buying in the weeks immediately ahead will not disrupt the price structure. It is reported from Oklahoma that some refiners are planning summer shutdowns in an effort to ease the pressure on the markets, signs of which began to appear immediately after the new taxes went into effect. Whether or not 1932 is to be characterized as a profitable year for the oil industry is likely to be determined in the coming few weeks.

STANDARD Oil Export Corporation, whose common stock is completely owned by four subsidiaries of Standard Oil Company (New Jersey), reported net income for 1931 of $1,923,487, principally dividends received from Anglo American Oil Company, Ltd. These earnings amounted to $2.51 a share on the $5 guaranteed

preferred stock, leaving $1,901,443 of the year's dividend requirements to be supplied by the four controlling companies as guarantors. In 1930 earnings amounted to $4,142,742, equal to $5.41 per share of preferred.

ACCORDING to compilation of Carl H. Pforzheimer and Company, brokers specializing in Standard Oil stocks, cash dividend payments of the Standard Oil group of companies for the second quarter of this year will total $46,308,873, compared with $46,801,053 in the first quarter and $57,843,467 in the second quarter of 1931. The disbursements for the first half year will total about 23 percent below the corresponding period of 1931.

EVIDENCE that the financial pressure upon the oil industry has lightened considerably since last year is to be found in the important bond retirements that have been and are taking place this year. Standard Oil Company (New Jersey) initiated the program by calling for payment on February 1 of $30,000,000 of its issue of $120,000,000 of 5 percent debentures of 1946.

Its subsidiary, Humble Oil and Refining, will redeem on July 15 its 5½ percent debentures which mature at that time and which at the close of 1931 were outstanding to the amount of $22,761,000. This retirement will eliminate approximately $1,250,000 of annual interest charges, the equivalent of about 40 cents a share on the common stock.

Standard Oil Company (Indiana) has called for payment on August 5 $10,000,000 of the $39,000,000 issue of 5½ percent debentures of 1938 of its wholly owned subsidiary, Stanolind Crude Oil Purchasing Company, which was formerly the Sinclair Crude Oil Purchasing Company. This will save about $550,000 of annual interest charges. On July 1, Pan American Petroleum and Transport, another subsidiary, will redeem about $3,350,000 of 6 percent convertible debentures.

Union Gulf Corporation, which is affiliated with Gulf Oil Corporation of Penna., called on June 1 about $2,000,000 of its collateral trust 5's of 1950.

COLON Oil Corporation, controlled by the Royal Dutch-Shell group, reported for 1931 a consolidated loss of $822,336 after all charges. For the 11 months ended December 31, 1930, the net loss had been $1,289,944 before depletion charges.

IMPERIAL Oil, Ltd., important Canadian subsidiary of Standard Oil Company (New Jersey), reported 1931 earnings of $18,226,894, equal to 68 cents a share, compared with 1930 profits of $19,020,360, equal to 71 cents a share. About $12,800,000 of the 1931 profits accrued to the parent company by virtue of its ownership of about 70 percent of Imperial's capital stock, and this amount was presumably included in the consolidated earnings statement of the Jersey company. Thus if Imperial's profits had been deleted Jersey Standard would have reported a deficit of about $4,100,000 instead of a profit of about $8,700,000. Approximately $9,500,000 of Imperial's earnings, that is, over half, are classified as other income, and about $7,700,000 of this was derived from its controlling interest in International Petroleum, which operates in South America, largely in Colombia and Peru. International Petroleum does not issue earnings reports and it is impossible to estimate what portion of these dividends may have represented a draft upon surplus instead of a distribution of last year's profits.

At the close of 1931 Imperial had total current assets of $66,752,422, including cash of $17,245,522, and total current liabilities were only $6,474,039. Speaking in the annual report of the investigation of the Canadian oil industry by a committee of the Dominion House of Commons, President Stillman said:

> The report of the committee, after considering all evidence, was that prices in Canada are not unreasonably high and that discrepancies between prices in Canada and at some United States points are due principally to demoralization of the United States gasoline market through tax evasion and distress selling and, to a lesser extent, to the inevitably higher costs of marketing in Canada

PAN American Petroleum and Transport Company declared a quarterly dividend of 25 cents a share on the new $5 par common and class B common share, payable July 20 to stock of record June 30. The new stock represents only the domestic business of the company, the foreign properties having passed under the control of Standard Oil (N. J.) through formation of a new company, Pan American Foreign, whose shares were distributed to Pan American Petroleum's stockholders. It is expected that the Pan American Foreign shares will soon be accorded trading privileges on the New York Curb Exchange.

CONSOLIDATED Oil Corporation, representing merger of Sinclair and the two Prairie companies, has made an offer to the various committees representing bondholders and creditors of Richfield Oil Company of California for acquisition of all the Richfield properties as a unit in exchange for $18,000,000 in six percent non-voting $100 par preferred stock of Consolidated Oil. Allocation of the stock among the various classes of creditors would be left to the various committees. One suggested basis of distribution in the event of acceptance of the offer was to

New York Stock Prices

1932 High	1932 Low	Current Div. $ per Annum	Stock (Par Value $)	Sales (Shares)	May 23 to June 18 First	High	Low	Last	Net Change‡
12⅞	8⅝	1.00	Atlantic Refining (25)	49,100	11½	11½	9⅛	10¼	−1⅛
5⅞	3⅜	....	Barnsdall 'A' (25)	35,000	4⅛	4½	3⅜	4½	+ ⅜
⅝	¼	....	Colon Oil (No)	1,600	⅜	⅜	¼	⅜	− ⅛
6⅝	4	....	Consol Oil (No)	144,800	5	5⅛	4	5	.....
7	3⅝	....	Continental Oil (No)	57,500	5⅛	5¼	3⅝	4⅜	− ⅜
2½	1¾	....	Creole Petroleum (No)	31,400	2⅛	2¼	2	2⅛	− ⅛
35⅞	23	....	Gulf Oil Corp. (25)	23,800	30	30⅞	23	25	−4½
49	35⅝	2.00	Humble Oil & Ref. (25)	12,100	39½	39½	35⅝	37½	−2
9½	6¼	0.50	Imperial Oil, Ltd. (No)	15,400	7⅞	7⅞	6¼	7	−1
1⅝	1	....	Indian Refining (10)	1,400	1	1	1	1	− ⅛
10⅝	8	1.00	International Petr. (No.)	35,800	10¼	10⅜	8	8⅝	−1⅜
8½	5	0.80	Ohio Oil (No)	57,500	7⅞	8¼	6¼	7¼	− ½
8¼	7⅞	1.00	*Pan Amer. P. & T. 'B' (50)	300	7⅞	8¼	7⅞	8	.....
6½	2	....	Phillips Petr. (No)	39,900	4⅛	4¼	2	3⅝	− ½
5⅛	2⅞	....	Pure Oil (25)	32,600	4	4	2⅞	3½	− ½
¾	⅜	....	Richfield Oil (No)	2,000	½	½	⅜	⅜	− ⅛
23	12⅛	†0.81	Royal Dutch N. Y. (13⅜)	34,200	15¾	16⅜	14¼	16⅜	+ ¼
9⅞	6⅝	0.40	Seaboard Oil (No)	42,200	8⅝	8¾	6¾	8¼	− ⅜
4½	2½	....	Shell Union (No)	19,400	3	3	2½	3	.....
4½	2½	....	Skelly Oil (25)	4,200	3⅛	3⅛	2⅞	3	− ¼
10¾	5¼	0.80	Socony-Vacuum (25)	211,300	8⅛	8¼	5¼	7	−1¼
27¼	15⅛	2.00	Standard Oil of Calif. (No)	108,800	18⅞	19¼	15⅛	18⅜	− ⅛
19¼	13⅛	1.00	Standard Oil, Ind. (25)	166,400	18⅜	19⅛	16⅜	18	− ½
12⅜	7	....	Standard Oil, Kansas (25)	3,500	7½	7½	7	7¼	− ⅝
15⅞	8⅞	1.20	Standard Oil, Ky. (10)	23,700	11⅛	11⅛	8⅞	9⅝	−1⅛
31½	19⅞	§2.00	Standard Oil, N. J. (25)	496,200	24½	26⅜	22	24⅞	+½
32	24¾	1.00	Sun Oil (No)	3,300	27	27½	25⅜	27	.....
13⅞	9½	1.00	Texas Corp. (25)	101,600	10¾	11⅛	9½	10¼	− ⅝
3½	2	....	Tide Water Assoc. (No)	25,900	2½	2½	2⅛	2¼	.....
13⅞	8⅛	1.40	Union Oil of Calif. (25)	18,300	9¼	9½	8⅛	9	− ¼
½	1/16	....	Venezuelan Petr. (5)	4,200	¼	¼	⅛	⅛	− ⅛

Since close of last month's table. † Paid for 1931—no regular rate. § Including extras. * Ex Pan American Foreign.

allow 50 percent of the par value for the $10,450,400 of six percent bonds of Pan American Petroleum Company (a Richfield subsidiary), 35 percent of the par value for the $24,981,000 of six percent Richfield bonds, and 20 percent of the face value for claims of unsecured creditors. It is understood that bankers, as unsecured creditors, do not favor the plan inasmuch as no cash is involved and it is feared that the large amount of Consolidated Oil preferred might not prove to have sufficient liquidity at a satisfactory price. The Getty interests of California made proposals several months ago looking toward control of the Richfield properties, and Cities Service has a large investment in the company which might make it reluctant to see control pass to other interests. Consolidated Oil has wanted to expand to cover the Pacific Coast territory, attempts having been made prior to its formation to include Tide Water Associated in the merger.

IT WAS stated by President Dawes at the Pure Oil annual meeting that profits in April and May, the first two months of the company's fiscal year, were about $1,500,000 greater than in the same period a year ago. It is understood that at that time the company was about breaking even, and on this basis the first two months of the current fiscal year yielded earnings of about 35 cents a share on the common after allowing for preferred dividend requirements. Pure Oil has been maintaining its sales of gasoline at high levels, but the most important factor contributing to the better earnings has been the higher price structure that has prevailed in the current period. C. C. BAILEY

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Mexican Eagle's Refinery

(Continued from page 289)

floor seals all cracks in the tile, which with the light vacuum maintained during the oven's operation almost entirely prevents oil seeping through the floor. As the oven is heated just beneath the floor, any small amount of oil falling through is utilized as fuel. Twenty gas burners at each end of the oven supply heat, which is distributed by ten 8 in. by 6 in. tunnels. A down draft flue under the center of the battery carries the gases to a common stack.

Asphalt bottoms from the asphalt tower are picked up by a centrifugal pump and charged through a preheater and single-pass pipe still where the temperature is raised to 800 deg. Fahr. From the furnace the heated oil goes to a manifold near the control house where it is diverted into one-inch lines which feed the three ovens. The coking process is continuous, each oven operating on an eight hour cycle, two hours and forty minutes behind the oven ahead.

At any given time, one oven has been cleaned and is receiving asphalt for a new run, the next is in full operation, while the third is in the various stages of drying, during which the oil is shut off and the coke bed is heated to drive off volatile constituents. An average cycle consists of: feeding 5 hours and 20 minutes, drying 2 hours, pushing 40 minutes.

The refinery boiler house is equipped with four Heine boilers, each of which develops 375 h.p. supplying steam at a pressure of 180 lb. per sq. in. Exhaust steam from the pumps is returned to three Foster-Wheeler steam superheaters and is then used as process steam. Electric current for power and lighting is not generated at the refinery, but supplied by the Mexican Light and Power Company.

Storage capacity is provided for 220,000 bbl. of crude, 60,000 bbl. of fuel oil, 28,000 bbl. of gasoline, 6,000 bbl. of kerosene, and 13,000 bbl. of gas oil.

The plant covers an area of 31 hectares. There are machine and paint shops for maintenance of equipment, baths for employees, and a first-aid station. All public approaches to the refinery have been asphalted and conditioned by the company. Other improvements include dwellings for employees and a tennis court. The entire grounds have been planted with grass, alfalfa, and shrubs, and every effort has been made to beautify the place.

The plant was formally inaugurated on March 5 by a ceremony at which President Pascual Ortiz Rubio and high Government and company officials were present.

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DR. W. G. WOOLNOUGH, energetic geologist attached to the Commonwealth Government in Australia, reports the growing tendency to use aerial geology which has found expression in Australia by the use of two Royal Australian Airforce airplanes in determining the value of aerial photography in the search for oil in Australia.

Statistical Record of Major Companies

(Continued from page 274)

fully in its report, and it is known that Socony-Vacuum reported on a completely consolidated basis in contrast to the former policy of Vacuum Oil (one of the predecessor companies) of publishing its statements on a parent company basis, which carried investments in subsidiary companies substantially below their book values.

These companies represent the cream of the industry; they are the ones that have had the best long term records, that are most strongly and widely entrenched, and that enjoy the greatest financial and other resources. Nevertheless, as a group they lost money last year, and over the past five years have never recorded any more than moderate profits in relation to their total invested capital.

To demonstrate this, we have added together for each of the five years the figures for total assets and for net earnings of 12 of the 14 companies of the exhibit. Royal Dutch was omitted because of the difference in currency, and Sinclair Consolidated lacked a 1931 figure for total assets due to its failure to issue its own balance sheet at the year-end following merger with the Prairie companies to form Consolidated Oil.

Summary for Twelve Companies

Year	Total assets (000)	Net earnings (000)	Percentage of earnings to assets
1931	$6,634,550	d$22,614	d0.3
1930	6,621,781	222,403	3.3
1929	6,444,405	492,080	7.6
1928	5,613,486	469,321	8.4
1927	5,157,943	218,034	4.2
Average	6,094,433	275,845	4.5

d—deficit

An average annual earning capacity of 4.5 percent cannot be considered adequate for the leading companies in as hazardous a business as that of oil, and even a return of 8.4 percent is hardly liberal.

The unique feature of the 1931 catastrophe is that the troubles of the industry were primarily due to internal factors, instead of the much overworked depression. Nevertheless, credit is due for the progress that has been made in controlling crude output and restraining refinery operations to enable the recovery in prices which has taken place since last summer and which has made it possible for the industry to get back into the black. If the present status can be maintained a little longer, or improved upon, the 1932 reports will portray a much pleasanter picture.

SHIPPING

London: June

ENQUIRIES for new construction are almost entirely absent with the exception of three specifications which have been issued for special craft. One of these is a single screw Diesel tanker for Socony Vacuum interests; but although shipbuilders throughout Great Britain were hopeful of receiving a chance to bid on this vessel it has since been announced that plans for the construction have been cancelled. Both the other enquiries are for coast-wise tankers, one for the Bulk Oil Company and the other for the Anglo-Saxon Petroleum Company or one of its subsidiaries. The Marine Department of this company is also taking bids on a small tug.

Tanker Speed

THE principal question which prominent tanker men are now debating among themselves with regard to new tonnage is one of speed. Will future tankers be big, 13,500 tonners running at about 11 knots loaded or will they be smaller 10,000 tonners operating at 12½–13 knots loaded? Or, will they be 10,000 tonners running at a loaded speed of 16 knots or over? To the naval architect and the marine engineer it is just as easy to produce any one of these three types to owner's requirements. Standard Oil interests at the moment seem to favour the first type. Anglo-Saxon interests prefer the second type while Japanese interests, largely controlled no doubt by Admiralty interests, seem to prefer the very fast type. It seems probable that the very fast tanker is not likely to have a great future for ordinary commercial purposes but the high speed at which Anglo-Saxon tankers of the new program are able to run in normal trading times is bound to have a great effect upon tanker design in the future. The action of the liner tanker companies in adopting definite policies of their own in the matter of speed and size is bound to have a determining influence upon the design of tramp tankers in the future. Hitherto, these have tended to be somewhat slow compared with the newest liner tankers and one important superintendent operating liner tankers has stated that their operation is not always so successful as those of the liner tankers when chartered and regularly owned ships are running side by side.

There is a noticeable tendency for charter tanker owners to get together and form societies of their own. In particular the Norwegian Tankers Central, as it is called, has been established and an Executive Committee chosen to decide on problems of immediate importance. They will rule, for example, on how ships owned by the members are to be employed on the freight market, or whether they are to be laid up. The economic lines are based on the principle of reciprocity. The executive committee will decide the date on which the new organisation will start, and till then the members of the organisation will operate their vessels as usual. The new agreement, which establishes a sort of tankers' pool, is an effort to fight the bad freight market. Norway has a large fleet of tankers. In fact, she ranks third among the nations which are in possession of tankers including about 200 vessels, with a total gross tonnage of more than 1,250,000. The new agreement only includes "clean" tankers with Diesel motors. By far the greater part of the Norwegian tankers is employed by the large oil companies on long-term charters.

Charter Market

ON THE whole the charter market has remained dull, although at the time of writing rather more enquiry is reported and a larger number of ships have been fixed, principally for the carriage of dark oils. Most of these fixtures are on normal runs and there are somewhat less Black Sea charters than has been the case in recent months.

Propulsion

IT IS understood that had the proposals of the Vacuum Oil Company to build their new tanker gone ahead, alternative bids would have been asked on steam and Diesel propulsion. The Vacuum Oil Company has hitherto made a practice of fitting its tankers with steam propulsion, at any rate as far as the ocean-going units are concerned. A number of units of the Vacuum fleet have been transferred to the Standard Transportation Company which already has considerable experience in Diesel engined ships. We may look therefore for some change in policy in the future. The principal rival to Diesel engine propulsion for tanker work is high pressure steam with water tube boilers and turbines, the boilers being abaft the turbines and the shaft running underneath the boilers. If the ship is running to ports where a good boiler oil is readily obtainable there is a great deal to be said for this; but in general as far as oil companies are concerned, where good boiler is obtainable, good Diesel oil is obtainable also.

New Construction

THERE is very little to report in the way of new construction, the OGEIC having been turned over to her owners, A/S Ocean, Oslow by A/S—Akerr Mek. Verk. builders. One of the most interesting craft recently to be completed is the LAKESHELL, built by Swan Hunter to the order of Dominion Tankers Ltd. of Toronto, a Shell subsidiary. This vessel's launch was reported in WORLD PETROLEUM for April. She is a 2,750 tonner with a mean draft of 15¼ ft. and is intended for service on the Great Lakes. She has 10 main oil tanks and the pumping equipment comprises two horizontal Duplex steam driven pumps rated for about 250 tons of water per hour; steam propulsion is fitted.

The WANDSWORTH WORKS, PLUME, PULPIT POINT, VOCO, ZAARA, VACUOLINE, and YARRAVILLE with an aggregate gross tonnage of 48,766 tons belonging to the Vacuum Oil Company Ltd. have been turned over to the Standard Transportation Company Ltd.

The PALMA, owned by N. V. Scheepvaart Mij. has been sold to N. V. Algemeen Vrachtkantoor, Rotterdam. The vessel has a gross tonnage of 196 tons and was built by J. Koster, Schpsw.

A. C. HARDY

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Municipal Council of Aalborg, Denmark, is reported to be considering a proposal to construct a large oil harbor.

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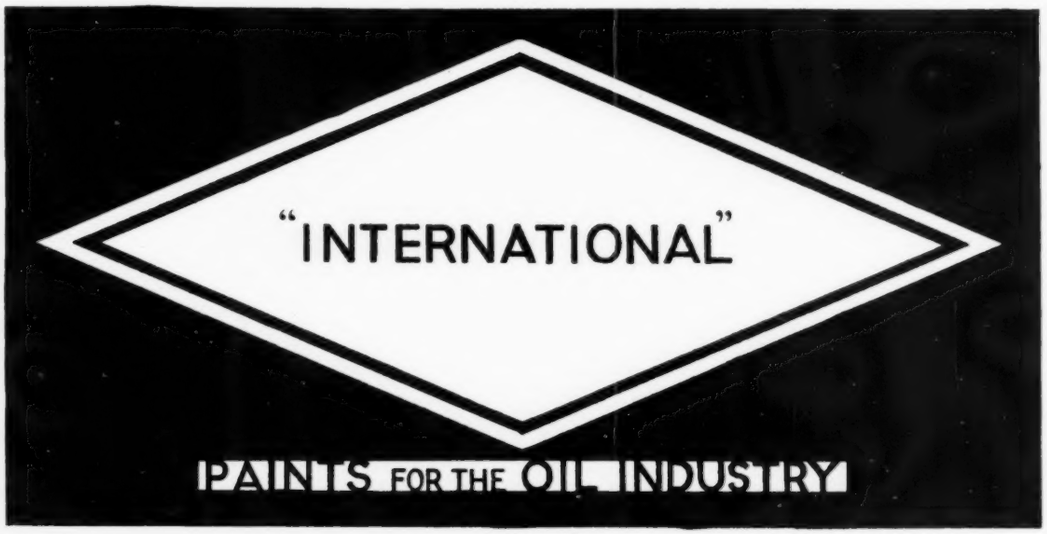

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